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November/December 2019

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CONTENTS



44 Lions, Processional Way, Babylon

FEATURES

24 LIFE IN THE CITY OF THE GODS

Inside the neighborhoods of Teotihuacan, Mesoamerica's first great metropolis

BY ZACH ZORICH

32 SEARCHING FOR THE WITCHES' TOWER

Archaeologists hunt for evidence of a 17th-century English family accused of witchcraft

BY MARLEY BROWN

38 FARM TO EMPEROR'S TABLE

Excavations reveal the inner workings of an ancient Roman imperial estate

BY MATT STIRN

44 MAGICAL BEASTS OF BABYLON

How the Ishtar Gate safeguarded the Mesopotamian world

BY JARRETT A. LOBELL

48 ARTISTS OF THE DARK ZONE

Deciphering Cherokee ritual imagery deep in the caves of the American South

BY WILL HUNT

Cover: The so-called Treasury, a sandstone tomb in Petra, Jordan
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DEPARTMENTS

4 EDITOR'S LETTER

6 FROM THE PRESIDENT

8 LETTERS

The last slave ship, a frugal medieval craftsman, missing headstones, and a warrior's pedigree

9 FROM THE TRENCHES

A souvenir from the capital, megalithic mystery in France, hard-hitting Hittites, and a recipe for ancient Egyptian bread

22 WORLD ROUNDUP

Island hopping to Australia, Dead Sea Scroll survival, Roman social security, and the village Canada forgot

68 ARTIFACT

Another face in the crowd

LETTER FROM JORDAN

55 BEYOND PETRA

After the famous city was deserted, a small village thrived in its shadow

BY SARA TOTH STUB

ARCHAEOLOGY.ORG

■ **MORE FROM THE ISSUE** To see more images from the Unnamed Caves in "Artists of the Dark Zone," go to archaeology.org/caves. For additional images of the stone faces in "Life in the City of the Gods," go to archaeology.org/faces.

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MAGICAL WORLDS

For the most part today, we consider magic incompatible with our scientific understanding of the world around us. For many past cultures, though, their relationship with the supernatural was deeply entwined with their understanding of the natural world.

In the seventeenth century, in Salem, Massachusetts, and across Europe, civic and church officials undertook witch hunts to track down and eradicate what they perceived as the dangerous practice of witchcraft. In 1612 in rural Lancashire, one family, the Devices, including a young woman named Alizon, her grandmother, and eight other members of their community, were the target of one of these hunts. In "Searching for the Witches' Tower," you will read about how the alleged witches of Lancashire may actually have been practitioners not of conjuring but of folk traditions that involved healing the sick, which were, at least in their world, as much science as magic.



Many Native American cultures of the prehistoric Southeast had a close relationship with the supernatural world, which they mediated by creating art in more than 100 caves in a region covering parts of Tennessee, Alabama, and Kentucky. These "Artists of the Dark Zone" drew creatures such as a panther with eagle talons, as well as disembodied faces and hands. According to archaeologist Jan Simek—who has explored dozens of the caves—these images functioned as conduits between the visible world and the underworld, between the earthly and supernatural. Such images resonated for both ancient visitors and the Native Americans who still visit these sacred spaces.

"Magical Beasts of Babylon"—fierce mythical hybrid creatures called *mušbuššu*, along with lions and bulls—guarded the processional way to the temple of Babylon's patron god, Marduk, and the Ishtar Gate, the entrance to ancient Babylon's sacred core. Much like the caves in the American Southeast, the processional way and gate were seen as passages between the everyday world and holy space. They are also manifestations of the Babylonians' faith in their ability to assert control over the natural world—molded clay bricks decorated with reliefs were infinitely replicable, and substances such as a blue glaze, which they considered equal in value to the semiprecious stone lapis lazuli, were seen as ways to communicate with the gods.

And don't miss Off the Grid, which takes you to Rathcroghan in western Ireland. It was there, at a possible entrance to the otherworld known as the Cave of the Cats, that medieval Irish epics identify the original location for the celebrations that eventually became Halloween. What could be more magical than that?

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FROM THE PRESIDENT

LOOKING AHEAD

Three years ago I introduced myself to you in my first letter, and now that my term as president of the Archaeological Institute of America is ending in January, this is my last opportunity to write to you. Although you are reading this in the November/December issue, I composed it in late June, at the end of my excavation season at Huqoq in Israel, when endings were on my mind. Actually, endings is not quite the right word, as our excavations will resume in future summers, just as the AIA and *ARCHAEOLOGY* magazine will continue to be a part of your life for many years to come.



This last letter provides an opportunity for me to reflect on my term as president, as well as on the future of the AIA. I am very proud of what we have accomplished together over the last three years. We have completely redesigned the AIA website (archaeological.org), restructured our membership categories to better serve our diverse constituencies, adopted guidelines for respectful behavior at our annual meetings and for professional conduct on fieldwork projects, and overhauled our regulations. For the first time in its more than 100-year history, our flagship journal, the *American Journal of Archaeology*, now has full-color illustrations. We have also implemented the President's Challenge, an initiative to bolster our highly successful lecture program for our 108 local societies.

The credit for these and many other accomplishments goes to the numerous people who serve the AIA in various capacities, including the staff of the Boston and New York offices, the officers and trustees of the AIA, and those who chair and serve on our committees. It has been my pleasure and honor to work with so many supporters dedicated to the field of archaeology in general, and to the AIA and *ARCHAEOLOGY* magazine in particular. In the next president's letter you will meet my successor, Laetitia La Follette, who has a long history of service to the AIA. I leave office secure in the knowledge that the leadership is passing to her capable hands.

Jodi Magness

President, Archaeological Institute of America

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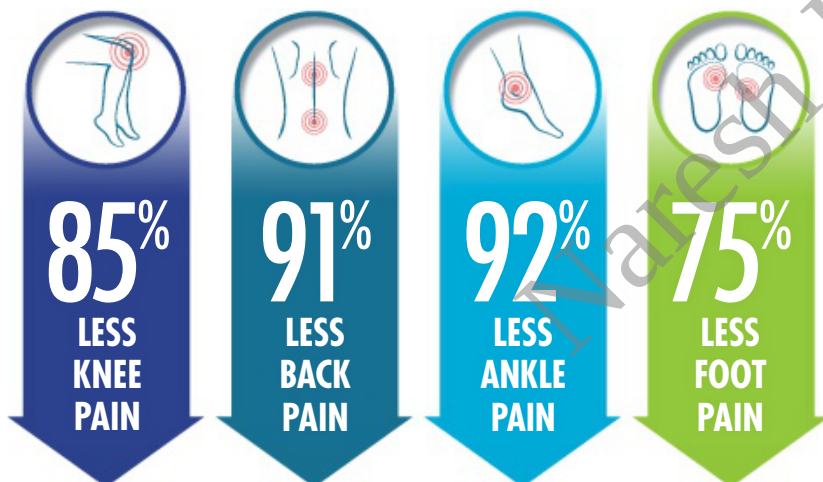
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FROM OUR READERS

CLOTILDA'S LAST SURVIVOR

I was intrigued by the article on the possible remains of *Clotilda* ("The Case for *Clotilda*," September/October 2019). In 1928, the African-American writer and anthropologist Zora Neale Hurston went to Alabama to interview the last surviving member of the slave cargo, Cudjo Lewis (originally named Oluale Kossola), who was then 86 years old. He was held as a slave for over five years until he was manumitted by Union soldiers in 1865. He spent the remainder of his life in Africatown, today's Plateau, Alabama. A result of Hurston's interviews was the book *Barracoon: The Story of the Last "Black Cargo,"* which was finally published in 2018.

Joseph M. Di Cola
Troy, OH

AN INTRIGUING BURIAL

Many thanks for the article on the grave of the Griffin Warrior ("World of the Griffin Warrior," September/October 2019). Both the description and the photographs are excellent, as is the background on the progress of recent understanding of the Myce-

naeans. Proposals for the relationship between Minoans and Mycenaeans might include what appears to me to be a strong parallel: ancient Greece and Rome. Neither case is either purely a military conquest—although a military takeover seems to have occurred—or mindless, uncomprehending, copying. Like Rome following Greece, the Mycenaeans appear to have embraced and adapted key concepts in religion, myth, and architecture, and styles in art, artifacts, and dress from the Minoans.

Stuart Wier
Boulder, CO

MEDIEVAL RECYCLING

I greatly enjoyed the article on underwater excavations in the River Wear ("A River Runs Through It," September/October 2019). However, I wish to offer one correction. The person who made the badge would almost certainly have tossed it back into the melting pot rather than into the river, as the metal could easily have been reused. Also, there are many examples of artifacts with serious casting flaws found at great distances from where they were made. It appears that both the makers and buyers of these items did not always insist on perfection.

Forrest Stevens
Princeton, ID

RESPECTING THE PAST

I enjoyed the article "Minaret in the Mountains" in the September/October

2019 issue, but have one comment. Did David Thomas' team actually collect or recover the headstones? Were they in a cemetery or scattered about? If in a cemetery, removal of the stones would be terrible, as that would forever obscure the burial location of the person being memorialized. Did the Italians collect headstones in the 1960s? Where are these and other objects collected from the site curated?

William J. Hunt, Jr.
National Park Service Archeologist (retired)
Adjunct Professor of Anthropology,
University of Nebraska-Lincoln

David Thomas replies:

You are absolutely correct in saying that it would be disgraceful if the gravestones were removed from their context in a cemetery. This is something my team and I would never have done. One stone was rescued from a pile of rocks being used to build the gabions protecting the base of the minaret, another was photographed in a side valley—the locals who showed it to us did not want it moved—and two others were in the ministry storeroom for safekeeping. The cemetery itself is poorly defined, and at least one grave is eroding out of the riverbank in too dangerous a location to conduct a salvage excavation, even if we had had permission from the relevant authorities. The cemetery has been looted for decades, which further complicates its documentation.

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PROOF POSITIVE

Nothing lives forever—except maybe yeast, which can go dormant and hibernate, perhaps indefinitely. An archaeologist, a biologist, and a baking enthusiast have recently embarked on a collaborative project to revive and reuse millennia-old yeast. They believe they have succeeded in identifying, isolating, and even baking bread with strains of yeast that may have been used by Middle Kingdom Egyptians to make bread—and brew beer—more than 4,000 years ago.

Archaeologist Serena Love of the University of Queensland is interested in brewing beer using Egyptian recipes, which scholars have attempted to piece together by studying tomb paintings and analyzing the microstructure of starch preserved in the archaeological record. Love, along with tech inventor and dedicated baker Seamus Blackley, set out to acquire ancient yeast strains that have secure archaeological provenance. They contacted museums across the United States and beyond, requesting to access their collections and extract yeast from Egyptian ceramics, stressing that the vessels would not be damaged. Eventually, they were given permission to work with artifacts housed at the Museum of Fine Arts, Boston, and Harvard University's Peabody Museum.

To help devise a noninvasive method of collecting the yeast while minimizing contamination, the team recruited University of Iowa biologist Richard Bowman. He, too, is interested in re-creating ancient beers and has developed a yeast-extraction method—still being refined—that aims to preserve the condition of antiquities while avoiding surface contaminants. Foremost among

these threats is airborne wild yeast, which, like all manner of fungi and bacteria, is all around us. Bowman's method involves using a needle-less syringe filled with liquid containing yeast extract, dextrose, and amino acids to moisten a cotton ball that has been placed on the surface of the artifact. "We continue soaking that particular area of the vessel until it is completely saturated and the cotton ball stops drying out," Bowman explains. After waiting five to 10 minutes for the liquid to penetrate the pores of the ceramic and "wake up" the yeast, the process is reversed. The syringe sucks the liquid back up through the same cotton ball and, finally, any harvested yeast is isolated and incubated.

Bowman says that it may never be possible to completely



A painted ancient Egyptian limestone fragment dating to around 2500 B.C. depicts servants baking bread.

FROM THE TRENCHES

eliminate the risk of contamination, and admits that the strains the team has thus far worked with may belong to ambient yeast floating around the museums. He was heartened to discover, however, that while the ostensibly ancient yeast did not take well to being grown in a modern lab, it responded immediately to conditions under which it would have grown in antiquity. “When Seamus put the yeast in emmer flour, which



Bread baked with ancient yeast

is what they would have been eating in ancient Egypt,” Bowman says, “it immediately proliferated.”

Love is now attempting to gain access to a broader range of artifacts from various periods and regions of ancient Egypt. She hopes to investigate differences in yeast used to brew the dozen or so varieties of beer that ancient Egyptians are thought to have produced. The team

also plans to send out strains of yeast for genome sequencing. “We can determine the yeast’s subspecies,” explains Bowman, “and by consulting a database of genetic information collected on yeast, we can then compare the strain to its descendants.” This should allow the team to create a model of gene transformation over time that will help estimate how old the extracted yeast is. For his part, Blackley says the bread made from the (most likely) ancient yeast was like nothing he’s ever tried. “I was a little concerned about its texture,” he says. “But when it came out of the oven, I could smell that it was going to be fantastic.”

—MARLEY BROWN

OFF THE GRID RATHCROGHAN, IRELAND

Rathcroghan, in western Ireland, covers more than three square miles and contains at least 240 archaeological sites spanning the time period from the Neolithic to the late medieval era. Its inhabitants began to raise animals and farm around 3,500 years ago, and went on to build stone structures and earthworks, remnants of which can still be seen. Rathcroghan is known not only from these monuments, but also from its pride of place in Ireland’s rich literary canon. The site is recorded in medieval accounts to have been a primary location for the ancient óenach, a ceremonial assembly featuring gatherings of legal scholars, boisterous feasts, and competitions of strength. It is also described as a burial place for Gaelic nobles and as the royal seat of the Connachta, who ruled western Ireland in the early Middle Ages. Rathcroghan features prominently in a collection of tales known as the Ulster Cycle, providing the setting for the beginning and the end of Ireland’s national epic, the Táin Bó Cúailnge, or the Cattle Raid of Cooley. Rathcroghan’s most notable landmark—Rathcroghan Mound—perches at the summit of a glacial ridge and measures nearly 300 feet across and 20 feet tall. Geophysical surveys of the mound suggest it may have been built up gradually over generations, possibly starting from a monument first constructed during the Bronze Age, and that an impressive building may have once stood at its top. “The mound is the center of the entire landscape, around which many of Rathcroghan’s barrows, ringforts, and standing stones are arranged,” says archaeologist and Rathcroghan site manager Daniel Curley.

THE SITE

The full Rathcroghan experience begins at Rathcroghan Visitor Centre in the village of Tulsk. There, audiovisual presentations provide an overview of the area’s history, and display cases present artifacts uncovered nearby. From the visitor center, a minibus tour departs for the top of Rathcroghan Mound, where visitors can

appreciate the landscape’s full panorama before stopping at specific sites. These include Oweynagat, or the Cave of the Cats, a cavern referenced in Ireland’s epics as a possible entrance to the otherworld, and a likely place of origin for the festival that eventually became Halloween.

WHILE YOU’RE THERE

History buffs who also appreciate a bit of nature can easily get lost amid the ruins of Rindoon, an abandoned medieval town about 30 minutes south of Rathcroghan by car. The fortified settlement, once home to more than 1,000 people, sits on a peninsula in Lough Ree, one of Ireland’s largest lakes. Well-signposted walks pass by buildings



Rathcroghan Mound, Ireland

and fortifications dating to the thirteenth century, when the area was beset by brutal wars fought between native Irish nobles and Norman barons.

—MARLEY BROWN



Bronze Age settlement, Zincirli, Turkey



Excavated artifacts



Burned dwelling

THE WRATH OF THE HITTITES

A thriving Bronze Age settlement at the site of Zincirli in southeastern Turkey was suddenly and catastrophically destroyed more than 3,500 years ago, archaeologists have discovered. A joint team from the Universities of Chicago and Tübingen uncovered two buildings that burned down, forcing their inhabitants to flee and leave behind their personal belongings. However, the layer of charred debris that covered the site preserved the buildings' contents, including an array of bowls, drinking cups, cooking pots, storage jars, and other domestic objects. "It's not that unusual for ancient settlements to have been burned and abandoned," says project codirector Virginia Herrmann of the University of Tübingen, "but we were definitely surprised to find such good preservation."

The project leaders believe that they know who was responsible for the swath of destruction: Hattusili I (r. ca. 1650–1620 B.C.), one of the first kings of the Hittite Empire, which was expanding its territory from central Anatolia during the second millennium B.C. and likely sacked the city. Says Herrmann, "The ability to connect this destruction to a known king provides a more precise historical context for our archaeological evidence."

—JASON URBANUS

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FROM THE TRENCHES



Horse snowshoe, Jotunheimen Mountains, Norway



Wooden tinderbox



Shod horse hoof



Tinderbox contents



Viking-period arrowhead

MELTING SEASON

Humans and animals have traversed the icy landscape of Norway's Jotunheimen Mountains for thousands of years. Now, melting ice patches at a site in northern Oppland County are exposing evidence of these often-treacherous crossings. A team of archaeologists led by Espen Finstad of the Secrets of the Ice Project has recovered hundreds of well-preserved artifacts scattered across the high mountain pass, including a Viking-period arrowhead, a horse's snowshoe, and a wooden tinderbox with leather straps containing a stick and

fragments of resin-filled wood. "We believe we are seeing a long series of losses and discards," says project codirector Lars Pilø, who remarks that none of the finds seem to be associated with any of the others, despite the fact that most appear to date to the Viking Age and medieval period. Not everyone who ventured into the mountains survived the harsh conditions, however. The team found a packhorse—its ribcage and shod hooves still partially intact—that met its chilly end centuries ago.

—BENJAMIN LEONARD

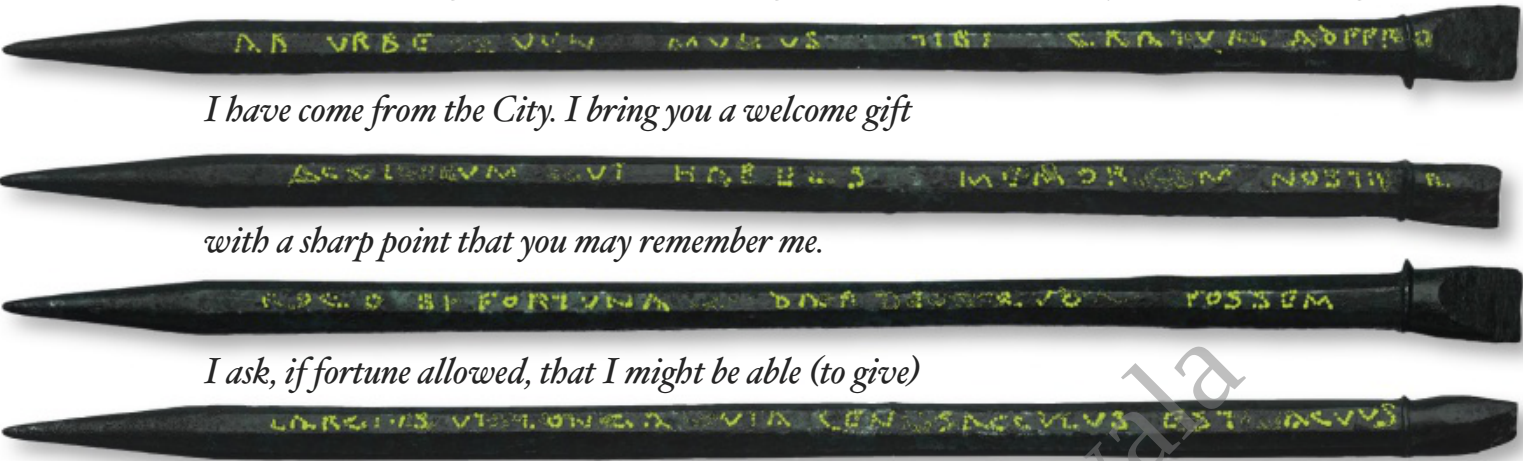
PROVINCIAL PEN PAL

Long before pressed pennies and postcards, a resident of Londinium (Roman London) received a witty souvenir from the empire’s capital. An iron stylus—a writing implement used to press letters into wax or clay tablets—dating to about A.D. 70, unearthed from a trash dump along a lost tributary of the Thames, bears a personal message in Latin etched along its sides:

In the decades following the conquest of Britain, Londinium experienced an influx of Roman soldiers and merchants, who brought with them goods from all across the Roman world. “This stylus is a clear demonstration of a personal connection between someone in Londinium, which lay close to the edge of the empire, and someone who

had been to Rome, which lay at its heart,” says Museum of London Archaeology senior finds specialist Michael Marshall. “The gift’s recipient, or a friend or family member, may have been the owner of this stylus.”

—BENJAMIN LEONARD



I have come from the City. I bring you a welcome gift

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Roman iron stylus (4 views)

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FROM THE TRENCHES

MEGALITHIC MYSTERY



Stone cairn and human burial, Veyre-Monton, France



Menhirs and cairn



Sculpted limestone menhir

Roadwork at Veyre-Monton in central France has revealed the first known megalithic site in the region. There, archaeologists from France's National Institute of Preventive Archaeological Research (INRAP) have uncovered evidence of cult activity spanning thousands of years, from the Neolithic period through the Bronze Age. They identified 30 menhirs, or monoliths, arranged from largest to smallest in a 500-foot-long line oriented precisely north to south. Most of the menhirs are made of local basalt and undecorated, but a single limestone example was sculpted to resemble a person, with two small breasts and an engraved chevron that might depict forearms.

At some point all the menhirs were intentionally buried, as was an adjacent four-sided stone cairn, measuring 46 feet long and 21 feet wide, that surrounded the tomb of a tall man. Despite the site's long use, the motivations behind the monuments' removal from the landscape are unknown. "It's very tempting to interpret this as the result of a change in beliefs," says INRAP archaeologist Ivy Thomson, "but it may also be linked to the disgrace of the community in control of the site, or even something more trivial."

—BENJAMIN LEONARD

WORLDS APART

Artificial islets called crannogs, which dot the cold loch waters of Scotland and Ireland, were once thought to have been used as defensive fortifications from the Iron Age through the seventeenth century. But both the constructions' purpose and when they were first built are being questioned. After former Royal Navy diver Chris Murray discovered Neolithic ceramics while exploring crannogs in bodies of water on Scotland's Isle of Lewis, archaeologists Duncan Garrow of the University of Reading and Fraser Sturt of the University of Southampton conducted underwater surveys at four crannog sites. They found that the crannogs were occupied starting



Crannogs, Scotland

sometime in the middle of the fourth millennium B.C.

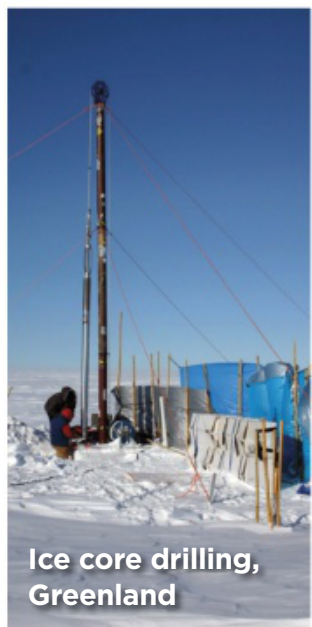
Garrow thinks that other crannogs across Scotland and Ireland may also turn out to be older than previously believed. "We had thought that the Neolithic period was marked by settlements with houses and hearths and then tombs, and subsequently stone monuments," he says. "In a way, these artificial islets are something in between." Garrow suggests that while some of the crannogs were likely inhabited, others were too small to have accommodated dwellings. These may have been used as ritual spaces intended to exist apart from the everyday world.

—MARLEY BROWN

THE LEAD STANDARD

Given that lead is a by-product of silver mining and smelting, historical levels of lead pollution can serve as a proxy for tracking economic growth and decline across the ages. A team of researchers recently studied lead levels dating back to A.D. 500 in 13 Arctic ice cores—12 in Greenland and one in the Russian Arctic. Their results reveal periods during which pollution levels increased or decreased, corresponding to historical records of new mining activity, technological development, or population growth, or outbreaks of disease, war, or famine.

For instance, lead levels shot up in the late eighth century, coinciding with the operation of a mine and mint at Melle in western France under Charlemagne (r. A.D. 768–814), founder of the Carolingian Empire, which controlled much of western and central Europe. During his reign, for the first time, lead levels in the ice



Ice core drilling, Greenland

cores exceeded those recorded at the height of the Roman Empire—some 600 to 800 years earlier—though they dropped after his death in A.D. 814. Later, in the mid-fourteenth century, pollution levels plummeted with the arrival of the Black Death

and remained low in some of the cores for a full century. “That’s a very long-term impact,” says Joe McConnell of the Desert Research Institute, “but if you kill off a third of the population of Europe, you can imagine that it would take a few generations to get back to the same level of demand and workforce.”

—DANIEL WEISS



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FROM THE TRENCHES

EGYPT'S TEMPLE TOWN

Before the rise of Alexandria in the fourth century B.C., the ancient port city of Thonis-Heracleion at the mouth of the Nile was the gateway to Egypt for foreign traders. The city and a suburb, Canopus, also served as a center of Egyptian religious life before a series of natural disasters submerged them by the eighth century A.D.

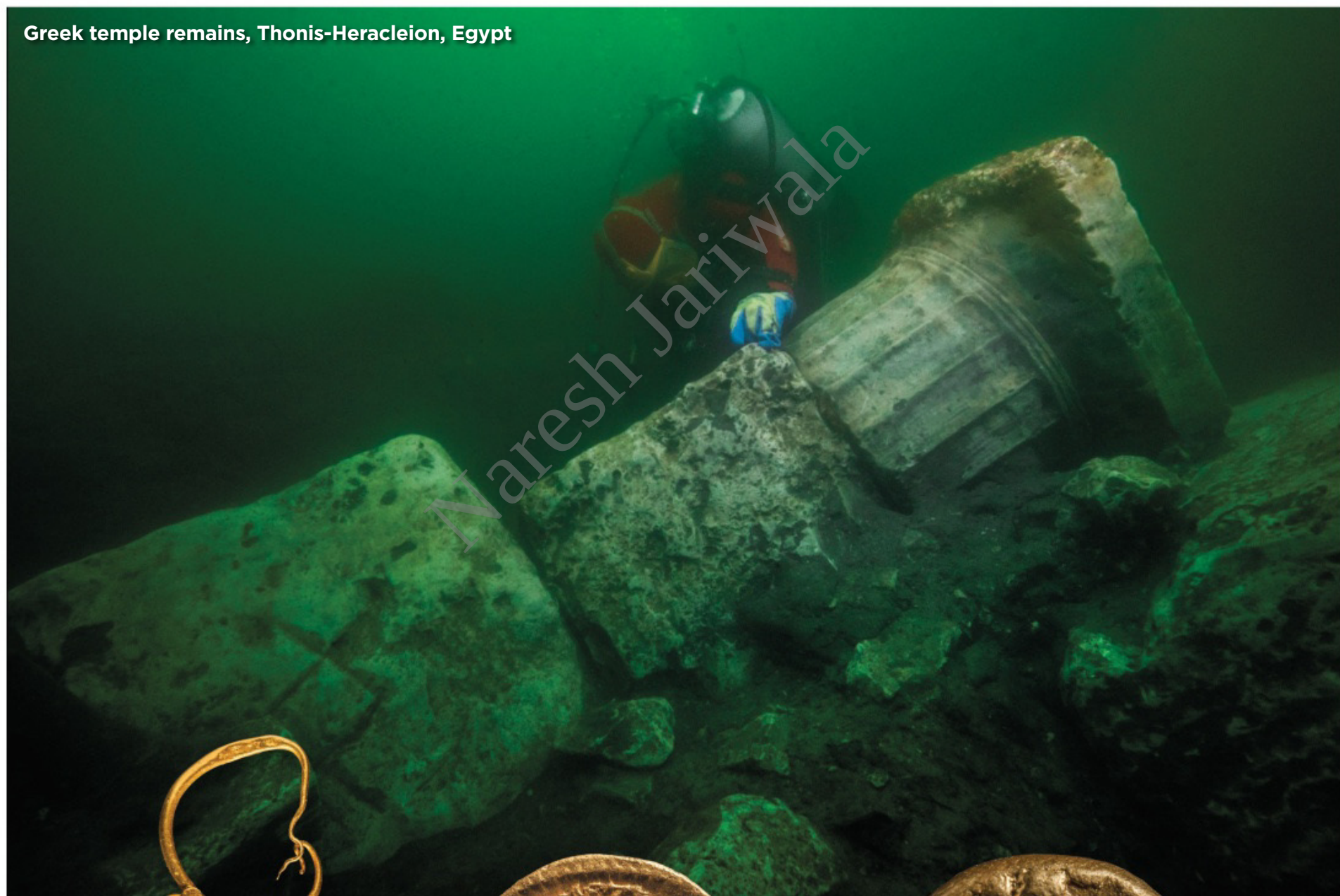
Recent excavations in a channel south of Thonis-Heracleion's main temple to the god Amun-Gereb have uncovered debris from its destruction around 140 B.C. Wedged among the building's blocks and columns were hundreds of mostly intact ritual

artifacts, ceramics, and bronze coins from the reign of Ptolemy II (r. 285–246 B.C.). Across from the temple's entrance, archaeologists discovered Doric columns belonging to a circular Greek temple.

Thonis-Heracleion's surfeit of sanctuaries, including temples dedicated to Hercules and Osiris, was a result of official favor bestowed on it for its economic significance. "The city was of prime importance to the pharaonic dynasties, which relied on it for taxes and customs duties," says Franck Goddio of the European Institute for Underwater Archaeology.

—BENJAMIN LEONARD

Greek temple remains, Thonis-Heracleion, Egypt



Byzantine jewelry, Canopus, Egypt



Byzantine gold coin, Canopus



4th-century B.C. bronze coin, Thonis-Heracleion



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FROM THE TRENCHES

AETHELBURGA'S LOCAL CHURCH

Excavations near an eleventh-century church in Lyminge, Kent, have exposed the foundations of an ancient predecessor. The Anglo-Saxon building dates to the mid-seventh century, just a few decades after Christianity, which had largely disappeared from Britain following the departure of the Romans in the early fifth century, was reintroduced by St. Augustine of Canterbury. One of the oldest stone churches in England, the seventh-century building was partially unearthed and then reburied in the nineteenth century, but a new project led by Gabor Thomas of the University of Reading is reinvestigating and documenting the site using modern archaeological methods. “Only a handful of stone churches dating from the earliest phase of English Christianity survive to the present day,” says Thomas. “Very few opportunities have arisen to explore these sites archaeologically.”

The church is thought to have been



11th-century church and Anglo-Saxon church foundations, Lyminge, England

founded by Æthelburga, princess of Kent and queen of Northumbria, whose empty tomb may have been identified in a small annex attached to the building's exterior.

Additional work nearby has uncovered traces of the monastic community that developed around the church.

—JASON URBANUS

DOWN BY THE RIVER

An 8,000-year-old wooden platform has been discovered on the seabed off the Isle of Wight. The platform, which has been excavated by researchers from the Maritime Archaeology Trust (MAT) and taken to a laboratory for study, lay under more than 30 feet of water. At the time it was built, however, sea levels were much lower, and the area was heavily wooded and abutted a waterway. The newly identified structure, which measures about seven feet by three feet and may have originally been substantially larger, consists of layers of split wood

resting on a perpendicular log foundation. It was identified by divers after it eroded out of the seabed. Building the platform would have required woodworking skills that were not thought to have been developed in this region until several thousand years later. “This is the most cohesive, most



Wooden platform in situ, Isle of Wight



Wooden platform in lab

intact Mesolithic structure to have been excavated in the United Kingdom,” says Garry Momber, MAT’s director. The platform was situated near a boatbuilding site, where the wood scraps used to construct it would have been found.

—DANIEL WEISS

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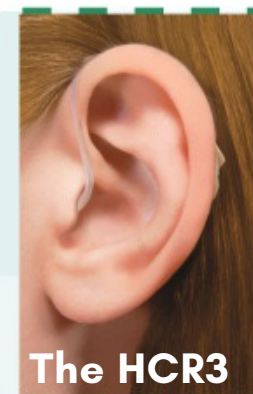
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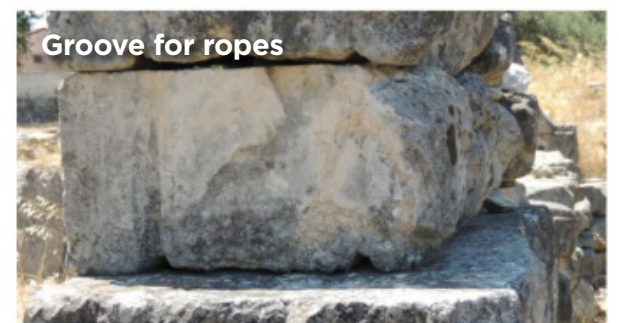
FROM THE TRENCHES

RISE OF THE GREEK CRANE

Ancient Greece is renowned for its extraordinary stone temples. Structures such as the Parthenon were only made possible by the invention of the crane, which is considered to be one the Greeks' greatest technological innovations. The device allowed heavy blocks to be lifted and set into place using relatively few men. "Lifting methods previously employed by the Greeks, as well as

by other ancient cultures, required large ramps and scaffolds of earth or mudbrick," says University of Notre Dame architectural historian Alessandro Pierattini. "Building and dismantling such massive earthworks required a large workforce."

It has long been thought that the crane was developed toward the end of the sixth century B.C. However, Pierattini suggests that the Greeks experimented with crane technology at least a century earlier. By reexamining ashlar blocks from the Temples of Apollo at Corinth and Poseidon at Isthmia—the oldest-known Greek temples built from stone—he determined that grooves cut into the bottom



Groove for ropes



Groove for ropes

and sides of these blocks were used to secure ropes attached to a primitive lifting device. Levers could also be inserted into the blocks, which weighed as much as 850 pounds, helping to maneuver them into their final position.

—JASON URBANUS



Temple of Apollo, Corinth, Greece

JETTING ACROSS THE BRITISH ISLES

Queen Victoria is known for wearing only black clothing during a mourning period for her beloved Albert that endured for no less than 40 years. She even went so far as to favor black jewelry made from jet, a gemstone that is composed of fossilized wood from a type of Jurassic-period British coniferous tree. But the queen was not the first Briton to wear jet jewelry. Archaeologists recently unearthed a jet necklace dating to sometime between 2200 and 1900 B.C. in a tomb under an earthen mound near the village of Kirk Michael on the Isle of Man.



Jet bead

Jet necklace

The crescent-shaped necklace consists of 122 decorated beads between 0.4 and 2 inches long. These jet gemstones came from Yorkshire, in northern England, suggesting that communities on the Isle of Man were connected to far-flung trade and exchange networks 4,000 years ago. "Whether or not the person who wore the beads lived on the Isle of Man for their whole life, left and returned, or was born elsewhere," says project codirector and Newcastle University archaeologist Chris Fowler, "the beads can be taken as an indication that this was a person of some importance because of the rarity of the material and its exotic nature."

—JASON URBANUS

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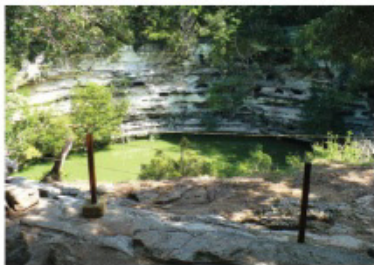
CANADA: Remnants of a forgotten early 20th-century Japanese village were uncovered deep in the forest outside Vancouver. They include 14 houses, a possible shrine, and a bathhouse, along with an assortment of

Japanese ceramics. The small settlement likely began as a logging camp, but community members may have chosen to remain even after logging ceased in order to avoid widespread anti-Japanese sentiment. The village's sudden abandonment was, perhaps, the result of Canada's establishment of Japanese internment camps in early 1942.

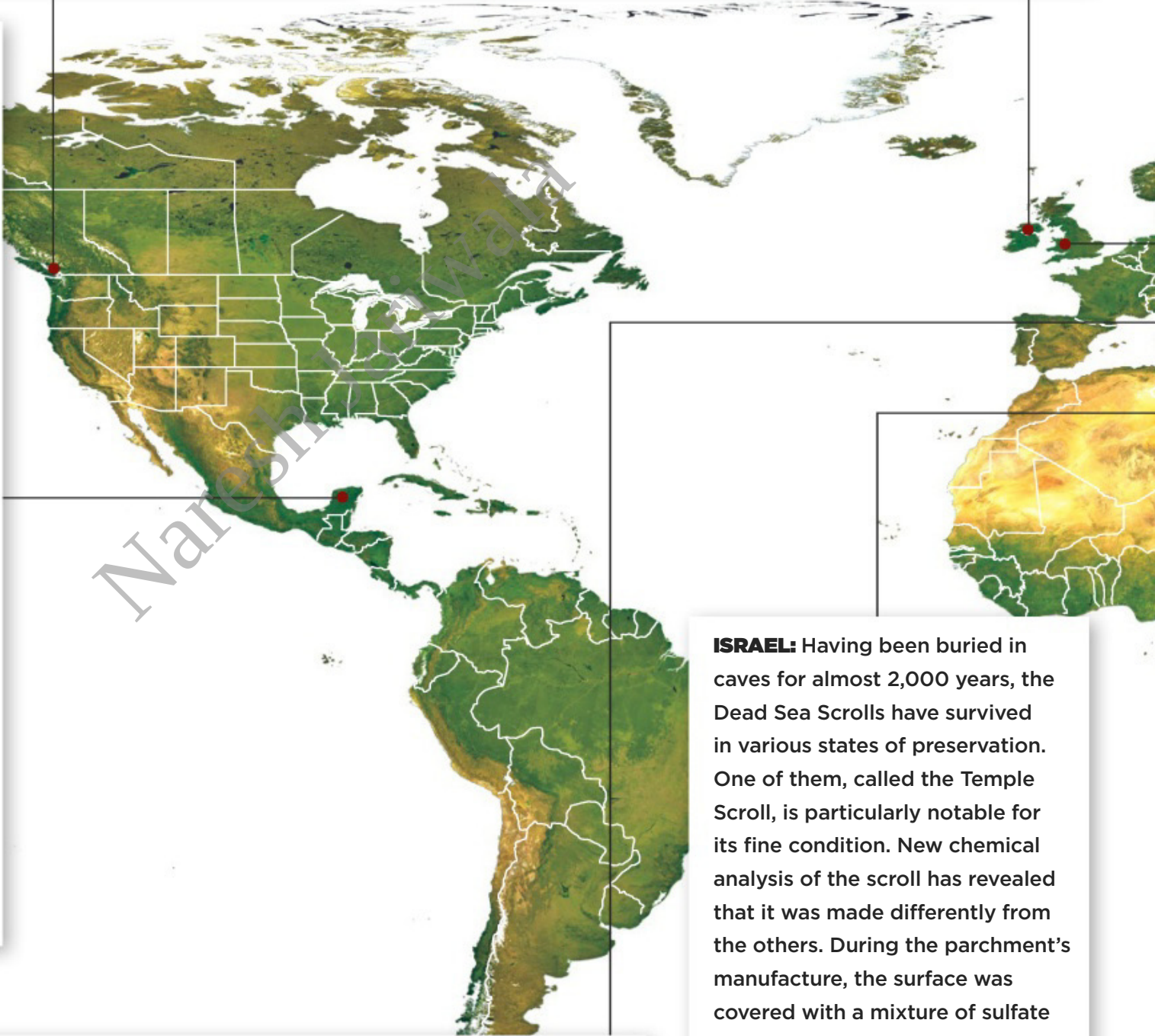


IRELAND: A farmer in County Meath who long suspected something curious existed beneath his field was proved right—a recent investigation revealed clues about his land's

surprising medieval occupants. French pottery, a grain-drying oven, and other artifacts are evidence of an unusual community of French Cistercian monks who moved to Ireland around the 13th century. Instead of founding a typical monastery, though, the monks established a grange, raising sheep and growing crops that they sent back to their home monastery of De Bello Becco in Normandy.



MEXICO: A millennium ago in Chichen Itza, the Maya practiced ritual human sacrifice. Scholars have long debated whether locals or outsiders were subjected to this grim fate. Using the results of isotope analysis of tooth enamel from sacrificial victims thrown into the site's Sacred Cenote, researchers have concluded that some grew up locally, while others hailed from the Gulf Coast, the Central Highlands, and as far away as Central America. It is unknown whether those born farther away were slaves, prisoners of war, or immigrants to the city.



ISRAEL: Having been buried in caves for almost 2,000 years, the Dead Sea Scrolls have survived in various states of preservation. One of them, called the Temple Scroll, is particularly notable for its fine condition. New chemical analysis of the scroll has revealed that it was made differently from the others. During the parchment's manufacture, the surface was covered with a mixture of sulfate salts, which has helped the scroll and its text survive.



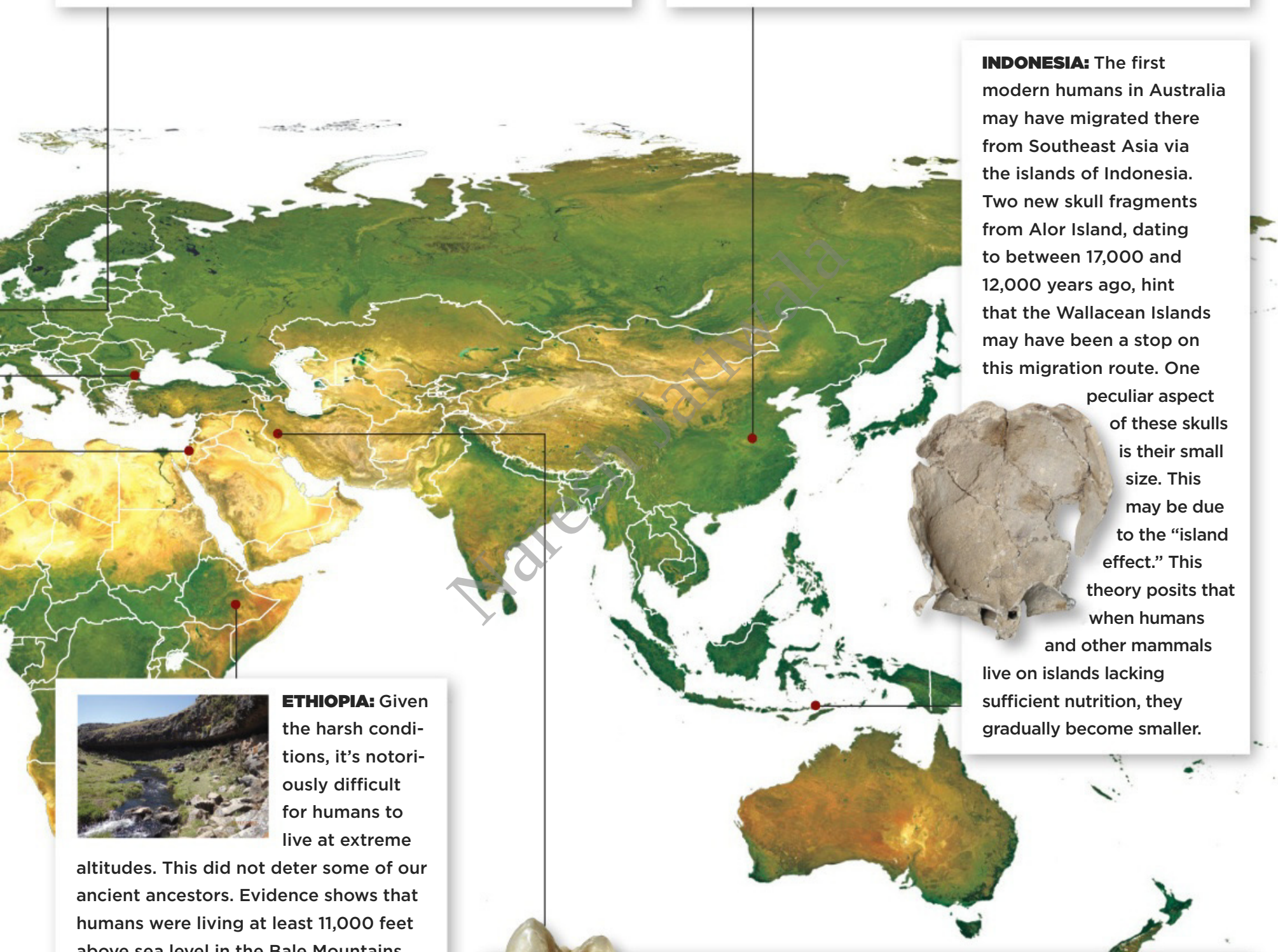
BULGARIA: Part of a Roman soldier's military diploma was found during excavations in the ancient city of Deultum near the Black Sea. These documents were issued to auxiliary troops upon completion of 25 years of military service, at which point they were, finally, awarded Roman citizenship. The small bronze fragment contains an excerpt of a decree issued by the emperor Hadrian in A.D. 122 ordering soldiers in the province of Dacia Inferior (modern Romania) to be discharged from their service.



ENGLAND: Nearly 100 military objects were retrieved from the site of the Battle of Worcester, the pivotal and final episode of the English Civil War. The artifacts left strewn across the field include musket balls, pistol shot, gun parts, and belt buckles. Almost 45,000 soldiers clashed in the 1651 engagement, during which Oliver Cromwell and his Parliamentarian New Model Army routed the Royalist forces, causing King Charles II to flee and temporarily interrupting the rule of the English monarchy.



CHINA: Obscure engravings on animal bones from the site of Lingjing in Henan Province suggest that early hominins who lived there 125,000 years ago may have had more advanced cognitive abilities than once believed. The mysterious markings proved to have been etched into the bone, which was then rubbed with red ochre powder to make the markings more visible. Experts do not yet know why early humans made these abstract designs, nor what they represent.



ETHIOPIA: Given the harsh conditions, it's notoriously difficult for humans to live at extreme altitudes. This did not deter some of our ancient ancestors. Evidence shows that humans were living at least 11,000 feet above sea level in the Bale Mountains some 40,000 years ago. Hearths, stone tools, animal bones, and human feces from the Fincha Habera rock shelter comprise the earliest-known evidence of a high-altitude residential site. It is believed that humans survived there by eating giant mole rats and drinking water from glacial runoffs.



INDONESIA: The first modern humans in Australia may have migrated there from Southeast Asia via the islands of Indonesia. Two new skull fragments from Alor Island, dating to between 17,000 and 12,000 years ago, hint that the Wallacean Islands may have been a stop on this migration route. One peculiar aspect of these skulls is their small size. This may be due to the "island effect." This theory posits that when humans and other mammals live on islands lacking sufficient nutrition, they gradually become smaller.



IRAN: It turns out that a fossilized tooth found decades ago in the Zagros Mountains did not belong to a modern human as previously thought, but rather to a Neanderthal child who lived between 70,000 and 40,000 years ago. A recent reexamination using modern techniques established the new dating and identification. The researchers say it is the first evidence that Neanderthals once lived in this area of present-day Iran. The species roamed across much of Europe and Western Asia before going extinct 40,000 years ago.

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Inside the neighborhoods of Teotihuacan, Mesoamerica's first great metropolis

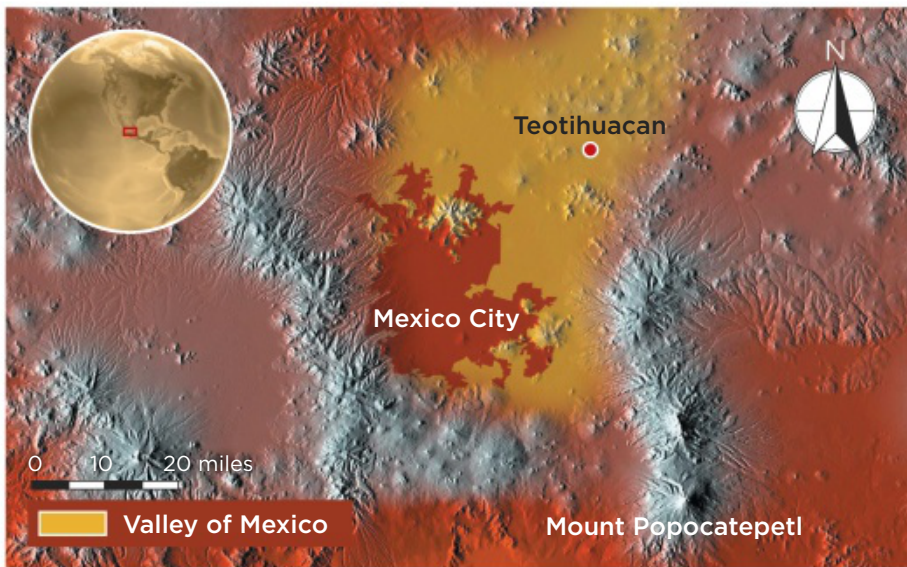
by **ZACH ZORICH**



The Pyramid of the Sun and the Pyramid of the Moon stand at the center of the ancient city of Teotihuacan in central Mexico.

THE GODS





WHEN POPOCATEPETL, a volcano overlooking the southern Valley of Mexico, erupted in the first century A.D., it blanketed nearby cities and farmlands with thick layers of ash. The cataclysm forced people to abandon their homes in search of arable land. Many of those fleeing the consequences of the eruption eventually made their way to the Teotihuacan Valley, 70 miles north of the volcano, where there were only a few scattered farming villages. Here, over roughly a century following the eruption, these refugees and their descendants laid out an urban grid, dug an extensive irrigation network, and built the center of what would become, for a time, the largest city in Mesoamerica, known today as Teotihuacan. The most politically and economically powerful center in the ancient Americas until the Aztecs forged their

empire hundreds of years later, Teotihuacan owed its existence to the disaster of Popocatepetl's eruption. "The city itself didn't exist before the movement of fleeing people," says Linda Manzanilla, an archaeologist at the National Autonomous University of Mexico who has been excavating in Teotihuacan for four decades. She and her colleagues estimate that at its peak around A.D. 400, some 100,000 people called the city home.

Mesoamericans first began to live in urban centers around 1000 B.C., and by the time Teotihuacan was founded, a number of cities of up to 20,000 inhabitants flourished in what are now Mexico and Central America. But uniquely among the major ancient cities of the New World, Teotihuacan was a centrally planned, multiethnic settlement from its earliest days. The city was organized around a broad central avenue now called the Street of the Dead, along which residents built three towering ceremonial platforms that would become known as the Pyramids of the Sun, Moon, and Feathered Serpent. For more than 100 years, archaeologists digging in and around these structures have unearthed shell ornaments and stone and ceramic figures, as well as murals depicting rituals and mythic events. Most of the city's residents lived in large standardized apartment blocks, and artifacts show that people came from all over Mexico to trade with the Teotihuacanos. Monuments in Maya cities as far away as present-day Honduras record events that show that the people of Teotihuacan wielded political influence over much of Mesoamerica.

Today, Teotihuacan's monuments attract legions of tourists, but most of the city's streets and buildings remain hidden beneath centuries of accumulated soil. Archaeologists are now working in several of the great city's neighborhoods, each of



which had its own character. Excavations in three different districts—a well-appointed noble quarter, a thriving middle-class immigrant enclave, and a working-class neighborhood whose inhabitants plied a trade that was vital to the city’s economy—are revealing what life was like for the people who made their fortunes in a city that went from being a safe haven for refugees fleeing a natural disaster to a vibrant cosmopolitan center. They are also showing how the tensions between the people and their rulers may have eventually spelled the massive city’s end.

SEVERAL HUNDRED YARDS west of the Pyramid of the Sun, a team led by University of California, Riverside, archaeologist Nawa Sugiyama and her father, Saburo Sugiyama, of Arizona State University, is excavating a district known since the nineteenth century as the Plaza of the Columns. It was named for a set of stone columns that have since disappeared. The subtle rise and fall of the ground surface here conceals the remains of buildings that were once home to some of Teotihuacan’s wealthiest citizens.

The Sugiyamas and their team have unearthed three buildings in the Plaza of the Columns. In one, they have discovered a cache of tools fashioned from human bone. “This is the first time I’ve seen anything like this,” says Nawa Sugiyama. According to the Sugiyamas and their codirector, National Autonomous University of Mexico archaeologist Veronica



A 20-inch-tall standing human figure made of greenstone (left) and a 15-inch-long incised shell ornament (right) depicting a warrior or hunter were discovered inside Teotihuacan’s Pyramid of the Feathered Serpent.

Ortega, such tools typically had important ritual functions in Mesoamerica. Their presence in the Plaza of the Columns could be grisly evidence for the high-status character of the district. “Human bone tools are not for everyone to have,” says Nawa Sugiyama. “They are very specialized.” How the people who lived in the Plaza of the Columns used these tools, though, is an open question.

Near the building that held the tools rises a large, unassuming hill covered with prickly pear cactus that contains the remains of the fourth-largest pyramid in the city, after the Pyramids of the Sun, Moon, and Feathered Serpent. The team has dug a narrow tunnel leading into the pyramid, which they stabilized with sandbags and thick wooden beams. Excavations here show that the pyramid was initially a small structure, but at two distinct times in later years, new stones were added to enlarge it. At the center of the pyramid, priests, or possibly other high-status Teotihuacanos, left a cache of artifacts as an offering to celebrate the first phase of the pyramid’s construction, around the same time as the Pyramids of the Sun and Moon were built. The cache includes an intricately worked obsidian blade and other prestige goods similar to objects found in caches at the city’s three larger pyramids. “The offering highlights that they had access to the very same quality materials as the people who were orchestrating the dedicatory rituals at the Moon Pyramid, Sun Pyramid, and the Feathered Serpent Pyramid,”



Small pyramids are arranged around a plaza at one end of the central avenue known as the Street of the Dead. The Pyramid of the Sun can be seen in the distance.

Teotihuacan's Stone Faces



Stone faces

Aztecs ventured to Teotihuacan in the fourteenth century and gathered ancient stone masks from the site to reuse as offerings in their own temples. Archaeologists have since unearthed dozens of such stone faces, most of which measure six to nine inches wide, from neighborhoods throughout the city. Many scholars assumed the masks, which have holes on their sides, were used during religious rites and then buried with the dead. Recently, anthropologist Jane MacLaren Walsh and mineralogist Timothy Rose, both researchers at the Smithsonian Institution, made a close study of more than 100 of the objects. They determined that the masks



Incense burner

were fashioned from limestone and three other types of stone found outside Teotihuacan's immediate territory. They also concluded that the objects were likely not masks at all. "They don't have any openings for seeing or breathing," says Walsh. "There's no way a human could possibly wear them." Furthermore, their research showed that the faces were found on the floors of temples, plazas, or rooms, not in burials.

Walsh and Rose believe the stone faces played a role in everyday rituals, and were perhaps displayed throughout Teotihuacan as the centerpieces of wooden dioramas that have since disintegrated. They note that ceramic incense burners from Teotihuacan known as "theaters" due to their ornate decoration feature small terracotta faces as their centerpieces. Teotihuacanos may have used the holes on the sides of the stone faces to tie them to larger wooden "sets" that perhaps resembled later Christian shrines. "When you walk in the older parts of Mexico City you see lovely statues of the Virgin Mary and saints," says Walsh. "The stone faces may have had a similar function." Their meaning may be lost, but the stone faces were probably a deeply familiar sight for Teotihuacanos going about their day.—*Eric A. Powell*

For more images, go to archaeology.org/stonefaces

says Nawa Sugiyama. Those rituals were probably important public spectacles meant to be seen by everybody living in the city. However, Nawa Sugiyama believes the ceremonies held at this smaller pyramid were private, intended only for the eyes of the high-status residents of the Plaza of the Columns, who may have included Teotihuacan's rulers.

To date, no recognizable depiction of a ruler has been uncovered anywhere in the city, leading to disagreements among scholars about the way Teotihuacan's 100,000 residents were governed. Saburo Sugiyama believes that the massive investments in monumental architecture and public rituals suggest that the city probably had a single ruler. But based on the way the city is divided by its main streets into four sections, Manzanilla thinks that it had four corulers who each governed one quarter of the city's 88 neighborhoods. She has proposed that beneath those four rulers was a second class of nobles who each oversaw a neighborhood. Other scholars think that the way Teotihuacan was governed may have changed over time.

Regardless of who ruled the city, multiple lines of evidence connecting Teotihuacan with the greater Mesoamerican world, especially that of the Maya, show that their power garnered them respect from near and far. One clear example of the close connection between Teotihuacanos and the Maya was found near the entrance of the main tunnel archaeologists dug into the small pyramid in the Plaza of the Columns. A side tunnel branches off, following the edge of what was the exterior of

the pyramid in A.D. 350, around the time the Teotihuacanos were at the height of their power. Excavations in the tunnel revealed the broken remains of decorated pottery rendered in a style employed by the Maya in the Peten region of Guatemala. According to Nawa Sugiyama, these vessels were high-status goods of a kind that might have been used in feasts held by the most powerful members of Teotihuacan society. She believes this is evidence of an important diplomatic meeting with representatives of a Maya city, and may suggest that an alliance was formed at a time when the rulers of Teotihuacan appeared to take a greater interest in their neighbors to the south.

More evidence of this type of high-level contact comes from the building directly north of the pyramid, where a mural was painted in the same Peten Maya style. Its creation would have required Maya artists to stay in Teotihuacan for weeks or months, and represents a substantial investment of resources for its sponsors. The mural seems to celebrate an especially important relationship—but one that didn't last. It is being recovered in pieces, and it appears someone in Teotihuacan went to a great deal of effort to tear the mural apart. "It looks like it went through a shredder," says Nawa Sugiyama.

The mural's destruction dates to the late fourth century A.D., which roughly coincides with events described on several stone monuments at the Maya city of Tikal in Guatemala's Peten rain forest. Inscriptions on some of Tikal's stelae record the arrival of a warlord from Teotihuacan named "Fire Is Born"

on January 16, A.D. 378. According to one inscription, the king of Tikal died, or more likely was killed, on that same day. Fire Is Born may have been a kind of regent who ruled Tikal on behalf of a man named Spear-Thrower Owl, who seems to have been a ruler of Teotihuacan. By A.D. 379, Spear-Thrower Owl's son was installed on the throne of Tikal, founding a new royal dynasty. These nobles who traced their descent to Teotihuacan made Tikal a regional power that defined the next several centuries of Maya geopolitics. This era was marked by unrelenting warfare between Tikal and rival Maya cities, as well as alliances with others that shifted over the centuries. For much of that time, some Maya leaders depicted themselves in attire that imitated that of Teotihuacanos, another clear sign of the city's enduring influence.

ABOUT A MILE AND A HALF south of the Plaza of the Columns lies an ethnically distinct neighborhood called Teopancazco. DNA analysis of 116 people buried there shows that while it was home to some Teotihuacan natives, it was also home to people from nearby central Mexican regions, as well as from 200 miles away on the Gulf Coast. The neighborhood was built around A.D. 200, well after the founding of Teotihuacan. Manzanilla's excavations here have revealed that Teopancazco was divided into distinct areas for carrying out rituals, producing crafts, and preparing food. She has also unearthed housing for soldiers and possible medical and administrative buildings. But the main businesses of Teopancazco, according to her research, were fashion and fishing.

Manzanilla's team has uncovered large numbers of bone needles, pins, and handles from paintbrushes that were likely used to decorate garments. Archaeologists have found pig-

ments for body and mural painting and an abundance of semiprecious stones such as pyrite, green quartz, and onyx that were used as ornaments for clothing. Manzanilla believes that the nobles of Teotihuacan came to Teopancazco to purchase costumes and ceremonial headdresses that were important for the rituals that likely sustained the nobles' legitimacy in the minds of regular people. Murals unearthed here depict dancing figures wearing the sort of garments that seem to have been a specialty of Teopancazco's residents.

The neighborhood also functioned as a major hub for traders who journeyed to and from the Gulf of Mexico and the Pacific. Analysis of the skeletons buried in Teopancazco showed that some people used their front teeth to work with fibers, part of the process of making fishing nets. Tools for



Fragments of a ceramic vessel made by Maya potters were unearthed in the Teotihuacan neighborhood known as the Plaza of the Columns, one of the city's wealthiest districts.

fashioning the nets were also found in the neighborhood. Fish and shellfish from the Gulf of Mexico, the Caribbean, and the Pacific Coast were unearthed, as well as the remains of crabs and a crocodile from the coastal region of Veracruz. Three individuals had a bone deformation in their ear canals that is caused by repeated diving in cold water, suggesting they may have lived near one of the coasts.

While the residents of Teopancazco had access to luxury goods such as semiprecious stones, they were far from wealthy. Their skeletons exhibited deformities that indicate the people frequently carried heavy loads and performed repetitive tasks such as throwing fishing nets or spears. The neighborhood itself may have been ruled by local nobles who controlled trade and manufacturing there and acted as go-betweens for the city's ruler or rulers. Though they may have ranked below the city's highest class, the rulers of neighborhoods such as Teopancazco probably played an important role in Teotihuacan's political life. And they may have yearned for more power than the aristocracy was willing to grant them.



A pyramid in the Plaza of the Columns neighborhood, now overgrown with vegetation, is the fourth-largest pyramid at Teotihuacan.

AT THE SOUTHERN EDGE of the city, a mile and a half from the Pyramid of the Feathered Serpent, lies one of Teotihuacan's poorer neighborhoods. Tlajinga was a center for processing obsidian, one of the city's most important trade goods. Teotihuacan lies within a day's walk of two important obsidian sources, and obsidian workshops are found throughout the city. Boston University archaeologist David Carballo excavated one of the apartment complexes in Tlajinga that was devoted to obsidian tool production. The neighborhood artisans were not producing luxury items such as the intricately flaked "eccentric" blades that are found in offering caches or spear points used by warriors. Their work, instead, was focused on making the standardized obsidian cores from which blades for basic cutting tasks were struck. In spite of the quotidian nature of the cores, they were an important part of Teotihuacan's economic power. Everyone living in Mesoamerica at the time needed obsidian to make cutting tools, and Teotihuacan controlled access to the stone in the Valley of Mexico and beyond.

Producing mass quantities of obsidian cores was an arduous and unglamorous trade. Nevertheless, people in Tlajinga lived in the same type of standardized apartment complexes as most other Teotihuacanos. "Everyone had pretty decent housing," says Carballo. He estimates that up to 90 percent



Fragments of a Maya-style mural found in the Plaza of the Columns are evidence of close contact between Teotihuacan and the Maya world.

of the city's population lived in these multifamily apartments. The complexes were square or rectangular and ranged in size from about 100 to 400 feet on a side, with living structures and workshops arranged around a central courtyard. Comparing the amount of living space available to families is one way archaeologists can measure inequality within a society. By this metric, Teotihuacan was one of the most egalitarian urbanized societies in the world at the time. Differences in wealth can, however, show up in more subtle ways.

Carballo says that fewer structures in Tlajinga were built of cut stone than was typical in wealthier neighborhoods. Cut

stone was more labor intensive to produce than mudbricks, and was likely more expensive to buy. The people here also had less access to lime plaster, which was used to waterproof buildings. Still, some luxury goods such as marine shells and semiprecious greenstones were discovered at Tlajinga, as well as a ritual stone face, similar to many others that have been found across the city. (See "Teotihuacan's Stone Faces" on page 28.) These objects demonstrate that the residents of Tlajinga had access to the same markets as the people living in Teopancazco or the Plaza of the Columns. While the lives of the people of Tlajinga during the peak years of Teotihuacan's power were probably good, eventually something seems to have happened that led the city's lower classes, and possibly the residents Tlajinga, to revolt against their rulers.

THE END OF TEOTIHUACAN'S most prosperous period came slowly—and then all at once. Archaeologists have found that, beginning around A.D. 450, the luxury goods that were the hallmarks of the city's economic power became scarce. Scholars are finding it difficult to tease apart the causes and effects of the city's decline. The population may have begun shrinking because the city's extensive irrigation system started to fail, or the irrigation system may have failed because



A mural unearthed at Teotihuacan depicts a priest attired in a costume similar to ones made in Teopancazco, a neighborhood where fashioning elaborate clothing was an important source of income.

the population became too small to maintain it. Traders may have stopped making their way to Teotihuacan because it could no longer meet their demand for goods, or because other cities did a better job of meeting their economic demands.

The city's decline was accelerated by a fire that raged through its center around A.D. 550 or 600. This brought Teotihuacan's far-ranging influence to an end. Nawa Sugiyama describes the fire as an iconoclastic act, targeted at palaces, temples, and other buildings associated with the city's ruling class. She plans to investigate burned buildings in the Plaza of the Columns, and hopes to find more evidence of what triggered the conflagration. While the fire ravaged the Plaza of the Columns and part of Teopancazco, it did not reach Tlajinga. "The very purposeful burning at the center of the site suggests there is some sort of rejection of the governing authorities," says Carballo. Linda Manzanilla believes that the neighborhoods' local leaders may have risen up against the city's overlords in an attempt to seize power for themselves.

Another factor that might have played a role in Teotihuacan's demise is that residents may have been steadily moving to nearby settlements. Excavations at the site of Chicoloapan, 25 miles south of the city, show that what had been a village of a few hundred people grew quickly starting around A.D. 500. According to Sarah Clayton, an archaeologist at the University of Wisconsin–Madison who leads the Chicoloapan excavations, by the time Teotihuacan burned, Chicoloapan's population numbered in the thousands. Whether those people migrated from Teotihuacan or else-



An apartment complex (above) was recently unearthed in Teotihuacan's Tlajinga neighborhood, where a carved stone face (left) was also discovered.



where is unclear. No ceramic artifacts typical of Teotihuacan have been found at Chicoloapan, indicating that the people living there may have been culturally distinct from the city dwellers. In any case, by the time Teotihuacan burned, Chicoloapan was a sprawling, prosperous town.

Even after the fire, Teotihuacan wasn't completely abandoned. "People still lived there in the tens of thousands," says Carballo. "It's rare to get complete demographic decline." But the things that distinguished Teotihuacan in its heyday were gone. The distinctive apartment compounds were never built again. The city's influence on allies at Maya centers such as Tikal seems to have vanished. No one ever again built pyramids along the Street of the Dead. And no Mesoamerican culture constructed such a massive, centrally planned city until the Aztecs arrived in the Valley of Mexico some 800 years later.

According to Aztec tradition, their kings made regular pilgrimages to the ruins of Teotihuacan, where they found farmers growing crops in the plazas at the foot of the Pyramid of the Sun. Teotihuacan was still a place that commanded awe and respect. In fact, the Aztecs regarded it as a supernatural source for their own political power, and gave the city the name it is known by today. In their language, Teotihuacan means "birthplace of the gods." ■



Worked pieces of obsidian called cores were processed by artisans in Tlajinga. The cores were used to make cutting tools and were a source of Teotihuacan's prosperity.

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A hawthorn tree in Lancashire's borough of Pendle is regularly adorned with fruit and small trinkets left by passersby and visitors to Malkin Tower Farm who are aware of the property's association with the area's 17th-century witch trials.



SEARCHING FOR THE WITCHES' TOWER

Archaeologists hunt for evidence of a 17th-century English family accused of witchcraft

by MARLEY BROWN

IN THE FIELDS BELONGING to Malkin Tower Farm, outside the village of Blacko, in Lancashire's borough of Pendle, stands a solitary tree where small charms, fruit, and even the odd dream catcher are known to appear. These offerings are left behind by amblers on countryside strolls who are aware of the farm's association with the notorious Pendle witch trials. In 1612, nearly a dozen people from this scenic region of hilly pastureland were accused of witchcraft, convicted, and hanged in the nearby city of Lancaster. Though they took place more than 400 years ago—nearly a century before the better-known witch trials in Salem, Massachusetts—the trials continue to captivate an eclectic mix of scholars, tourists, and neo-pagans. Researchers now conducting excavations at Malkin Tower Farm are hoping to find archaeological evidence of the witches themselves. The task is a daunting one, since material remains of magical practice are often ephemeral and difficult to distinguish from everyday objects. It also requires an under-

standing of the Lancashire in which the condemned lived, which was beset by religious and social upheaval, as well as substantial changes in traditional modes of rural life.

The team, led by archaeologist Charles Orser of Ontario's Western University, chose to investigate Malkin Tower Farm because it shares the name of a property where the family most closely associated with the trials, the Devices, are known to have lived. The location Orser selected is only one of the possible locations for their home. No standing buildings from the seventeenth century—and no tower—survive at the site, and the exact location of the Device family home was

never recorded. But in this part of the world, where farms are handed down over generations, place-names persist. "The names of individual fields, in particular, can be very ancient in this area," says Malkin Tower Farm owner Andrew Turner, who, with his wife Rachel, operates holiday accommodations at the property. "I wouldn't be surprised if the name 'Malkin' is actually quite a bit older than the 1612 trials."

The farm's current



This contemporaneous illustration depicts women being hanged for witchcraft in Newcastle upon Tyne sometime between 1650 and 1662. The city was one of several locations where witch hunts and executions were conducted in the 17th century.

cottages, which sit on the lower slopes of a hill and look out over a vista of pastures, stone walls, and small lakes, date to the eighteenth century. Orser chose to investigate a field directly behind them, hoping to find evidence of earlier buildings. A 2018 field season based on geophysical surveys didn't turn up much, but the team has now encountered what Orser says are the remnants of a demolished residence. "Clearly where we're excavating now is a tumbled house, there's no question about it," he says. "And I can imagine that the local authorities would have wanted to demolish a house that they believed was associated with evil."

THE STORY OF HOW Malkin Tower came to be associated with the devil's work is recorded in a 1613 volume entitled *The Wonderfull Discoverie of Witches in the Countie of Lancaster*. The history was written by Thomas Potts, a clerk at the Lancaster Assizes, the court where the Pendle witches were charged and condemned. The narrative, whose bias toward the prosecution is clear, describes the events as follows: On the 21st of March 1612, a young woman named Alizon Device was begging on the road leading to the village of Colne when she met a traveling peddler named John Law. She asked Law for some metal pins. He declined and, shortly after his refusal, suffered a collapse of a sort that would now likely be diagnosed as a stroke. Law recovered well enough to make it to the local inn, or to a house nearby, where he told of his encounter. He claimed that, before his collapse, the young woman had cursed him. Deciding to take the case to the authorities, Law and his family contacted the local justice of the peace, Roger Nowell, who took statements from Alizon;



her mother, Elizabeth Device; her brother, James Device; and Law's son, Abraham. The initial examination must have piqued Nowell's curiosity. Seeking other local reports of witchcraft, he questioned Alizon's grandmother Elizabeth Southern—who was in her 80s, blind, and known in the community as "Old Demdike"—as well as another octogenarian, Annie Whittle, nicknamed "Old Chattox."

By April 4, according to Potts' history, Nowell had heard enough. He committed Alizon Device, Old Demdike, Old Chattox, and Old Chattox's daughter, Anne Redferne, to prison in Lancaster Castle to await trial. Fears of a witch conspiracy came to a head when reports reached Nowell that, on April 10, fellow witches and friends of the Devices and Old Chattox attended a meeting at Malkin Tower. There, they were said to have plotted a prison break, discussed spells and hexes to cast against the authorities, and planned to blow up



Archaeologists are searching the pasture above Malkin Tower Farm's 18th-century buildings for evidence of a 17th-century dwelling.

Lancaster Castle. Nowell extracted confessions to the effect that the meeting was not a one-off, but rather a regular witches' "sabbath" held at Malkin Tower. He then arrested several more people on suspicion of participation. The accused were alleged to have used forms of malevolent magic to curse humans and animals to cause them disfigurement or death, to have created clay effigies representing victims, and to have cultivated supernatural entities, called "familiars," that were said to appear in the guise of animals, to do their evil bidding. The trials were held on August 18 and 19, 1612, by which time Old Demdike had died in jail. In the end, Alizon, Elizabeth, and James Device, Old Chattox, and six others were found guilty and executed.

DOCUMENTARY EVIDENCE OF the Device family essentially disappears after the executions, even though the young-



The footprint of a possible 17th-century dwelling has recently been excavated. The site may have been used as a dumping ground after the structure was demolished.

est member, a small girl named Jennet, survived the trials. Jennet was probably around seven or eight at the time and is thought to have been forced to give evidence against her sister, brother, mother, and grandmother, a rare example of a young child's testimony being admitted in an English trial. It entered common law as a precedent that is still studied by legal scholars today.

Once Orser had identified archaeological evidence of a domestic dwelling, his next task was to determine what artifacts might possibly be related to magic. "One of the problems is that you are often really just looking for mundane, quotidian objects," he says. "You might be lucky and find, say, a specific type of German stoneware jug made during the period called a bellarmine, which was used as a protection device against witchcraft. Or you might find the pins sometimes put in those bottles, such as the kind Alizon Device supposedly asked John Law for." More often, though, he explains, archaeologists look for artifacts arranged in certain ways, or objects that have marks on them that might be symbolic.

Amid the ruins of the house at Malkin Tower Farm, the team has unearthed what they believe is a hearth area and, in the same vicinity, a mostly intact pipe bowl. Orser hopes the bowl will soon be confirmed by specialists to date to the early part of the seventeenth century, the very time that the Device family may have been living there. The researchers have also discovered a substantial assemblage of coarse earthenware vessels that would have been used for serving food and drink, as well as for collecting and storing milk. Many of these fragments appear to date from the same period as the pipe. While nothing Orser can point to as being

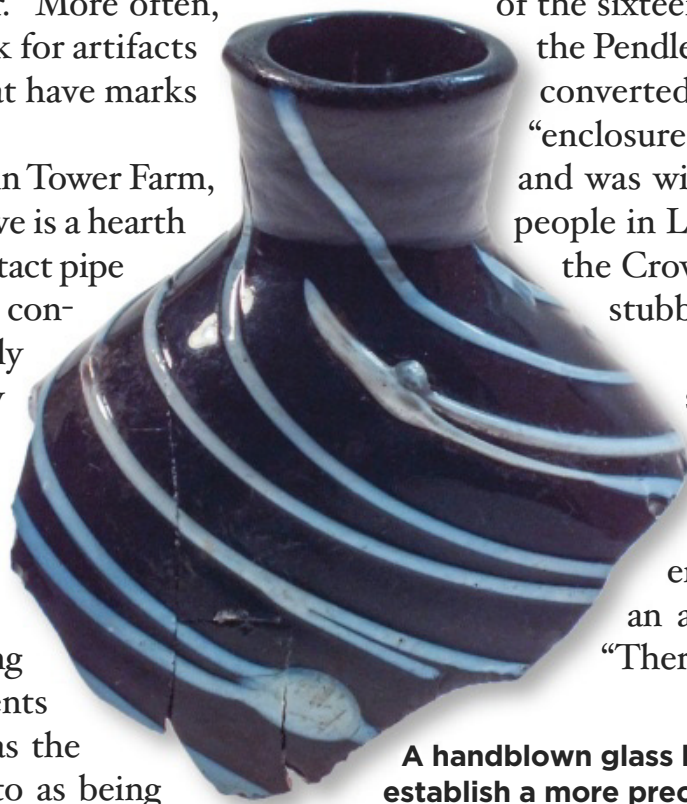
overtly magical has yet been found, some intriguing possibilities have begun to emerge. "In addition to the well-preserved pipe bowl, we found a piece of ceramic that is almost mirror-like," Orser says. "If you're familiar with scrying, a practice of looking into a surface to get visions, that's what this will make you think of." For reasons still debated by scientists, many people report hallucinations upon staring into a mirror, or a similarly reflective surface, for an extended period. "This fragment could be the right age, and I've never seen anything like it," Orser says. "It practically reflects."

In Potts' account of the trials, he makes much of the allegation that Old Demdike and the rest of the Device family created effigies, called "pictures," out of clay, which they used to manipulate and cause pain to their victims. On the west side of the house, Orser's team has uncovered a number of nuggets of pure clay. "There were hunks of something like modeling clay that were clearly distinct from natural clay deposits," Orser says. "It was very unusual in terms of the surrounding soil."

The large volume of coarse earthenware Orser has recovered may be a result of the site's use as a dumping ground following the demolition of the house. The number of later eighteenth- and nineteenth-century ceramics indicates the former homestead may have been a trash heap for at least 100 years after the building was razed. "We just can't figure out exactly where all of this stuff could have come from," Orser says. "There's a tavern nearby, which may have been contemporaneous with the 1612 trials, but it's a long way to bring your trash." He suggests the placement of the dump might be due to lingering negativity in the minds of local people, even generations removed, resulting from the witch trials. To Orser's surprise, one excavation layer contained a nearly intact, hand-blown glass bottle, for which he now hopes to obtain a date.

TO LOOK OUT FROM Malkin Tower Farm today is to survey a landscape of neatly divided fields that has not changed substantially in almost 400 years. The last time it did, Old Demdike was alive to see it. The latter part of the sixteenth century was a tumultuous period in the Pendle area. Common lands were rapidly being converted into private pastures, a policy called "enclosure" that began in the late Middle Ages and was widespread across Britain by 1612. Many people in Lancashire also provoked the ire of both the Crown and the Church of England for their stubborn refusal to abandon Catholicism.

Local Pendle historian John Clayton has spent years consulting property deeds, legal documents, and municipal records held in the Lancashire Archives. He says that the social, religious, and economic environment of the time may have created an atmosphere conducive to a witch hunt. "There was currency inflation throughout the



A handblown glass bottle found in the dwelling may help to establish a more precise date for the structure.



This illustration from a 19th-century novel about the Pendle witches depicts a witches' gathering like the one that allegedly occurred at Malkin Tower on April 10, 1612.

larger estate. "It's possible Demdike was on a holding her family had held for a generation or two," Clayton says. When they couldn't afford to pay the extra money to buy the land after James I canceled all leases, he suggests, it may be that another family took over the land and allowed the Devices to stay in the building, which was called Malkin Tower.

Clayton points out that other communities across England faced similar tensions over property ownership at the time, and thus resentment over access to land resources is not enough to explain accusations of witchcraft. Additionally, while tens of thousands of people are estimated to have been executed in continental Europe during witch persecutions from the fifteenth through the eighteenth centuries, in England that number appears to have reached only into the hundreds. That witch scares were relatively uncommon in England raises the question of what specific circumstances might have been to blame in Pendle and for other witch hunts that occurred intermittently over the seventeenth century.

Part of the answer lies in the personal beliefs of and laws passed by James I, who, in 1590 (when he was King James VI of Scotland, but not yet king of England) attended witch trials in North Berwick, East Lothian. In 1597, he published *Daemonologie*, a treatise on various forms of black magic. In ensuing years, the monarch became obsessed, for a time, with stamping out witchcraft, during a period that coincided with the Church of England's general policy of repressing English Catholics, a large community of whom lived in Lancashire. "Possibly the whole 1612 trials, and surely the Potts account of them, were specifically designed with James I in mind, to show support for his views and to curry favor at court," says Orser. Government and church officials had only to find a way to conflate what they considered heresy with witchcraft. "These families living on the fringes in

1500s, as well as a series of weather-related crises in the agricultural system," Clayton says. A 1507 law had given local landowners the opportunity to acquire land in Pendle on lifetime leases. The tenants who managed to acquire newly enclosed lands immediately became the haves, while smallholders and those living on the margins became the have-nots.

A century later, in 1607, King James I (r. 1603–1625) added fuel to the fire by decreeing existing leases invalid, provoking a scramble on the part of landowners to legally repurchase their property. "This meant that only the wealthiest landowners had the opportunity to officially take on their land," Clayton says. "and that they also had the opportunity to take on the land of their poorer neighbors."

Clayton is among those who do not think that the current Malkin Tower Farm is associated with the Device family. Based in part on place-names referenced in the law clerk Potts' account, he is beginning to explore an alternative site a few miles away. He suggests the owners who built the current Malkin Tower Farm in the eighteenth century may have appropriated the Malkin Tower name, perhaps because of a similarly named field already existing at the property. Clayton and Orser do agree, however, that archaeologists should be looking for a dwelling that was probably demolished and subsumed by a



A 17th-century clay pipe bowl (top), possibly dating to the period of the 1612 trials, was discovered in the vicinity of what archaeologists believe are the remnants (above) of a hearth.

rural Lancashire were hanging on to Catholicism. They may not have even been doing it as a protest but just because it was the way things were,” Orser says. “In some instances, what are referred to as ‘spells’ are pieces of old Latin prayers.”

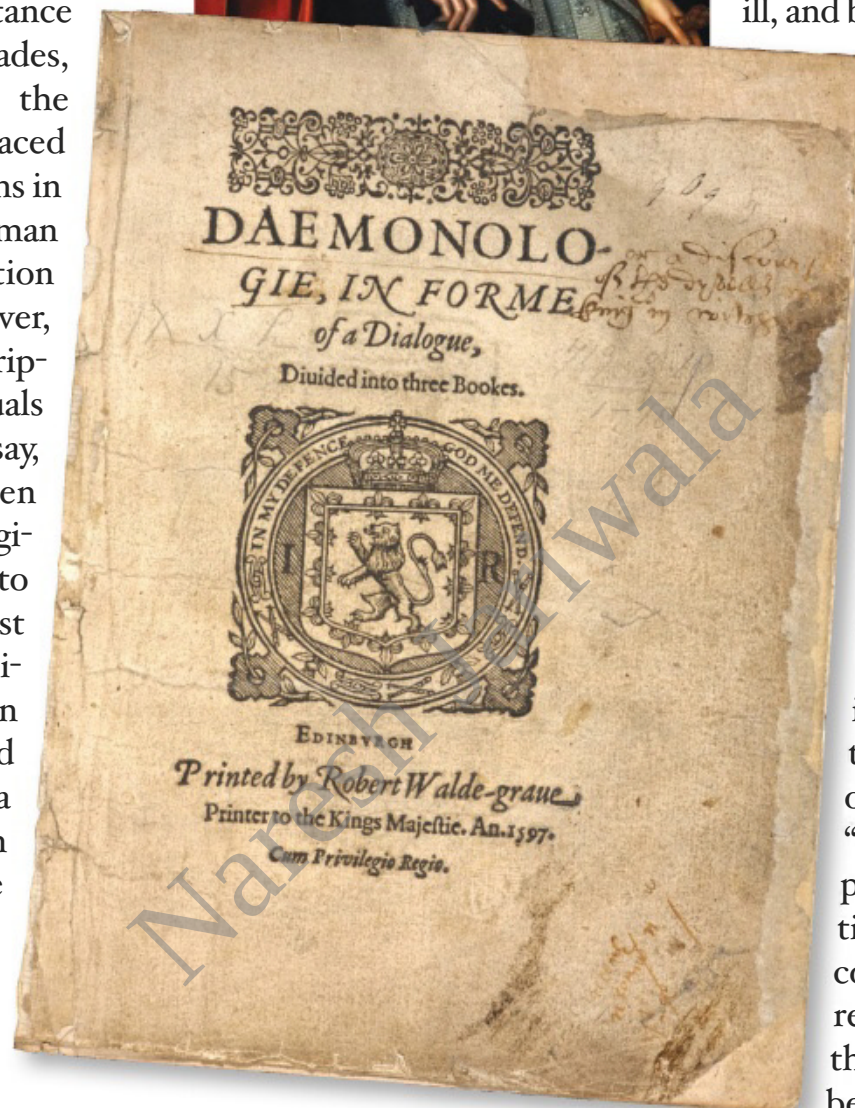
Another explanation for the Pendle witch trials may lie in forgotten folk practices that often go unmentioned in official historical documents. Seventeenth-century Britons were mostly illiterate, lived by the rhythm of the agricultural calendar, and fought illness without the assistance of modern medicine. For decades, many historians subscribed to the notion that as Christianity replaced indigenous pagan religious systems in the British Isles from the late Roman period onward, magical superstition died out. Archaeologists, however, do find objects, markings, inscriptions, and other evidence of rituals and practices that should, they say, be considered magical. “When people start talking about magical invocations, they rarely try to define magic,” says archaeologist Christopher Fennell of the University of Illinois. “One definition of magic is that it is any kind of personal supplication from a once-dominant religious system which got pushed off center stage by a new system.” Christianity, Fennell says, by way of example, marginalized paganism in England, but individual rituals surviving from those belief systems continued to be carried on in private spaces. “The problem for archaeologists,” Fennell says, “is when it’s private and for personal reasons, you have tremendous opportunity for variation, and it’s hard to know what to expect.”

Adding to the difficulty for Orser and his team is that the overwhelming majority of magical evidence is found in surviving buildings and not in the ground. “If you’re excavating in a house, or doing a preservation survey, you’re more likely to find something,” Orser says. Commonly documented practices in England include the deliberate caching of shoes in walls, or the etching of markings of three—an allusion to the Holy Trinity—into fireplace mantels to ward off accidental blazes. “There’s a chance you could find something like that in the soil, like a cat skeleton or horse head buried under the threshold of a building,” Orser says. “But otherwise, how can one tell certain mundane objects from other mundane objects that were used in magical or spiritual ways?”

It is impossible to know just how effective people thought



An early 17th-century oil portrait (left) of King James I by John de Critz. The king published a treatise on black magic (below) titled *Daemonologie* in 1597. For a period in his life, the monarch was obsessed with hunting down and eradicating witchcraft.



these practices were, but their neighbors clearly believed that Old Demdike and Old Chattox had some kind of power, as they both made their living traveling from farm to farm to heal sick livestock. “Farmers didn’t necessarily understand why their cattle were ill, and believed these women had the ability to cure them,” Orser says. “The other side of that coin, of course, is that if you can cure, you can curse, too.” A sudden outbreak of disease in a community or a spate of personal misfortune could easily be blamed on such a healer, known in the parlance of the time as a “cunning woman.” There needn’t even have been any evidence of malevolent intent, Fennell says, for such traditional folkways—even if they were widely accepted in the community—to be recast as evil. “You have people who are practicing folk religion without concerning themselves with Christian concepts of Satanism or diabolism,” he says, “but they’re in danger if they’re practicing their own folk religion at a time when tensions arise within their community.” All that may have been required for any folk magic practices the Device family was engaged in to be misconstrued as witchcraft was for an authority figure, such as justice of

the peace Nowell, to become involved. “Beginning in the late 1500s,” Fennell explains, “both ecclesiastical and civil authorities completely reconceptualize everything and persecute anyone they find problematic, often elderly women who weren’t necessarily thinking about going against Christianity, but were engaging in traditional practices intended to manipulate spiritual forces, whether to protect or to harm.”

Determining whether a family of witches lived at Malkin Tower Farm will require a careful cataloging of the hundreds of objects Orser and his team have recovered from the hillside. Even when this work is complete, arriving at a definite conclusion may never be possible. And who is to say that even if some incontrovertibly magical artifact were to appear in the ground, another such object wouldn’t also appear at the next farm over, and the next, and the next after that. ■

Marley Brown is associate editor at *ARCHAEOLOGY*.

An aerial view of the excavations at the imperial agricultural estate of Vagnari in southern Italy shows researchers at work at the main settlement, or *vicus*, in the foreground. Across the ravine at the top of the rise lies a cemetery that is also being investigated. During its height in the second century A.D., the estate would likely have encompassed all the visible cultivated fields.





FARM TO EMPEROR'S TABLE

Excavations reveal the inner workings of an ancient Roman imperial estate

by MATT STIRN

THE SOUTHERN ITALIAN region of Puglia rolls across seemingly endless hills of golden grain that stretch in every direction. Bordered by the azure waters of the Adriatic and Ionian Seas, this area at the heel of Italy is home to the bustling ports of Bari and Monopoli. Yet away from the coast and past the fortified medieval cities of Ostuni and Alberobello, the sunbaked landscape begins to feel uninhabited. Moving deeper into Puglia's interior, the towns give way to single farmhouses, which, in turn, disappear, leaving only the gently waving rows of wheat that guard an agricultural legacy going back more than 2,000 years.

At the end of a two-track road that winds around ravines and through cultivated fields of wheat and chickpeas, a line of square trenches cuts deep into the rich soil. Under neat rows of modern crops lies the ancient site of Vagnari, named after an eighteenth-century *masseria*, or farmhouse, that sits abandoned nearby. Here, between the first and early fourth centuries A.D., a succession of Roman emperors owned a 6,000-acre farming estate, the remains of which are only now beginning to be uncovered. Although such imperial farming estates are known to have existed throughout the empire, Vagnari is the first to be excavated, providing new insight into how a rural farm supplied emperors' needs and provided them with a source of revenue. "Whether in Italy, North Africa, or anywhere else in the Roman Empire,

A ceramic loom weight from the third century B.C. stamped with a mythical chimera, a silver coin dating to 211–208 B.C. with the head of Jupiter, and a bronze coin dating to A.D. 330 displaying a portrait of Constantine were all found in the *vicus*.



imperial estates are grossly under-explored,” says archaeologist Maureen Carroll of the University of Sheffield. “We have ancient written evidence, such as inscriptions and historical texts, but that’s all that anybody has ever concentrated on. The only way to learn more is to excavate.”

Of course Vagnari was not only home to fields of grapes and cereals intended for the emperor’s table, but also to freedmen, freedwomen, slaves, and children who lived, worked, and died on the estate. Across a deep ravine from the center of the settlement is a cemetery that is now giving researchers a detailed look at the health and living conditions of the people who supplied the emperor’s food and wine.

WHILE SURVEYING WHEAT fields nearly 20 years ago along the route of the ancient Via Appia, a 365-mile-long Roman road that connected Brundisium (modern Brindisi) to Rome, archaeologist Alastair Small of the University of Edinburgh identified an area where plows had churned up a large quantity of ancient Roman pottery sherds, glass fragments, and roof tiles. In 2000, he conducted test excavations that exposed ancient stone walls and more Roman ceramics and glass. These were the first clear signs of Vagnari’s existence—no textual or epigraphic evidence of the

estate had ever been found. During that field season, Small’s team discovered two ceramic roof tiles, each bearing an inscription that reads *Grati Caesaris*, “Gratus of Caesar.”

Small believes that Gratus oversaw ceramic production at the site, and that he was a slave because only his first name appears in the inscription; Roman citizens, by contrast, were traditionally identified by three names—praenomen, nomen, and cognomen—in inscriptions. For Small, this was an early indica-

tion that Vagnari had been owned by the emperor, a surprising insight given that many scholars considered Puglia to have been a rural hinterland with little importance to Rome.

Since the discovery of Vagnari in 2000, a number of teams have excavated at several locations across the site. Small continued his fieldwork until 2011, focusing on the *vicus*, the site’s administrative and economic center. In 2012, Carroll expanded the half-acre *vicus* excavation, while Tracy Prowse of McMaster University continued her exploration of Vagnari’s cemetery, which had been discovered in 2002. Prowse and Carroll now direct a multidisciplinary team, including biological anthropologists, experts in biomolecular and isotope analysis, archaeobotanists, metallurgists, glass experts, and parasitologists, all dedicated to better understanding the economy of the site and its connection to Rome.

While the team’s work centers on the *vicus* and the cemetery, Carroll and Prowse believe the story extends beyond the limits of the excavation trenches. They think that there would have also been vineyards, markets, houses, slave quarters, stables, a bathhouse, and a variety of other structures required for maintaining a large agricultural estate. Prowse imagines that the site served not just as the emperor’s storehouse but also as an economic center for the region that drew people from miles away. “I like the idea that there would have been little hamlets dotting the countryside, with Vagnari at the core,” she says. “For example, if people needed something, like a new cooking pot, or to get a metal item repaired, they could come to the *vicus* because they might not have the resources to obtain those items on their own.” Vagnari likely functioned as a kind of trading post, offering resources and provisions to people living farther out in the countryside.

Despite Vagnari’s imperial history, the site had far humbler beginnings. An earlier settlement there had been abandoned by the third century B.C. At this time, southern Italy was being



A fragment of Roman glass sits atop recently tilled soil in the Vagnari cemetery. Small artifacts such as this originally suggested to archaeologist Alastair Small that a Roman site was located there.

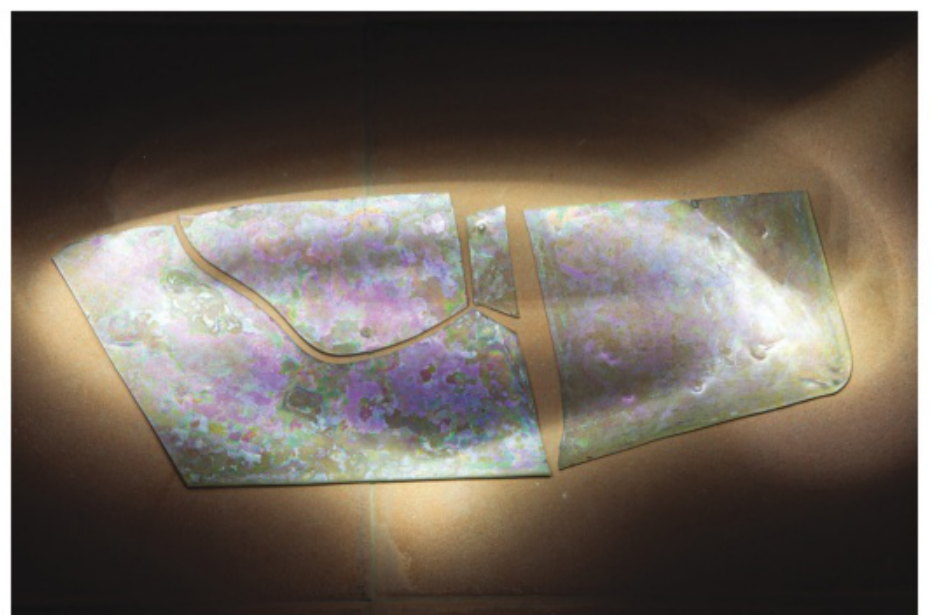


An excavated trench in the *vicus* shows a building's outer wall and two small rooms. Artifacts and botanical specimens recovered there suggest the structure was used for grain processing, wine production, and lead smelting.

battered by a violent campaign launched by Rome against the local Peuceti tribe and by an attempted invasion by Carthaginian troops led by the general Hannibal. The first-century B.C. poet Horace would later describe Puglia as “made desolate by war,” and the second-century A.D. historian Appian portrayed the postwar region as nothing but “parched and dry.” Excavations in the region, however, suggest that it was quickly resettled and became an important agricultural resource for the expanding Roman world. In recent years, archaeologists have found evidence of farms, estates, and villas dating to the second century B.C. across Puglia that were either reoccupied or newly constructed at the end of Rome’s campaigns against the Peuceti and Hannibal.

This resurgence in building and land use suggests that, after the violence ended and Rome established a firm grip on the region, enterprising farmers, magistrates, and wealthy Romans ventured south to claim plots of land as their own. In contrast to the interpretations of ancient writers and earlier academics who imagined Puglia as a rural wasteland, the archaeologists’ discoveries suggest that the land was quickly transformed into a bustling agricultural economy. Vagnari, too, has yielded evidence for such settlement, including stone walls, loom weights, and large subterranean storage vessels called *dolia*. Carroll believes these structures and artifacts demonstrate that the people who reoccupied the site focused on small-scale textile production and farming. As farms replaced the once-charred landscape, the eyes of the emperor drifted from his residence in Rome toward southern Italy and the economic opportunities waiting there.

ROME UNDERWENT IMMENSE changes as the 500-year-old republic began its transformation into an empire under Augustus (r. 27 B.C.–A.D. 14). As the emperor extended his power, he confiscated large tracts of land throughout rural areas of southern Italy and North Africa that had previously been owned by dissident generals and senators or tribal leaders. Recast as imperial estates, these properties were used to raise funds to support the emperor’s lifestyle and personal expenses. Shortly after the transition from republic to empire, when the slave Gratus might have been producing ceramics at the site, the settlement of Vagnari experienced a dramatic



A broken windowpane recovered from the *vicus* excavations is an example of the type of luxury goods that were imported by the estate. The image was captured by shining a flashlight on the glass to highlight its iridescence.



The burial in the cemetery of a 40-year-old female who died during the late 1st to early 2nd century A.D. was filled with luxury artifacts.

change mirroring that experienced by the empire as a whole. Carroll's team has uncovered evidence dating to this period of new construction and the establishment of a winery with huge dolia. It has also identified a large quantity of imported artifacts—for example, lead brought from Sardinia that was used for water pipes and to mend the dolia and other vessels, fine pottery from North Africa, and utilitarian ceramics from Albania, as well as imported glass windowpanes, an exceptional luxury in the Roman world. Carroll believes that this shift from a rural outpost to an internationally connected settlement provides a rare snapshot of what took place when such a property was acquired by a Roman emperor. "The pottery and other objects that we've found suggest that the transition probably occurred under Augustus, or possibly his successor, Tiberius," Carroll says. "That's quite an exciting moment in time to capture." What had once been a simple farmstead producing local crops and household cooking pots became a massive agricultural and trade center that sourced goods from across the Roman Empire. Vagnari was to maintain its imperial role until the middle of the third century A.D., when, says Carroll, its population began to dwindle for unknown reasons.

At Vagnari's prime in the second century A.D., provisioning it would have been extremely costly—but frugality was never the norm in Rome. A large investment was made in the estate and, in turn, the emperor received a generous income from the site's agricultural production. Vagnari was at the center of Italy's bread belt, and with the support of Rome behind it, may have been one of the largest agricultural producers along its stretch of the Via Appia. The estate was also producing a great quantity of wine, which was stored in the massive dolia, six feet in circumference, that had been transported more than 200 miles from Rome and could each hold 650 gallons of liquid. To Carroll, it is puzzling why such effort was expended on moving the vessels. "What we see here makes no sense economically. It's illogical to bring giant wine storage vats all the way from Rome when they could have easily been made right here," she says. "But because this is an imperial estate, the rules don't apply. The emperor owned the factories where the dolia were made, so when he wanted a winery at his estate in Puglia, he

sent his own dolia rather than bringing them from somewhere closer." However, while the emperor's private reserves funded the transportation of dolia and construction of the winery, the ultimate success of Vagnari's agricultural economy was tied to the wisdom of local farmers.

Archaeobotanical analysis of charred plants from a crop-processing building at Vagnari that likely burned in antiquity has revealed that the system of farming practiced there reflected a deep familiarity with the region's climate and annual rainfall patterns. This analysis shows that multiple grains, including emmer, einkorn, wheat, barley, and oats, were all grown simultaneously. Producing such a variety on one farm was not common in antiquity, as each grain requires different environmental conditions and processing techniques. The impetus for this labor-intensive practice may have been unstable climatic conditions that are known to have occurred during the second century A.D. Pollen grains extracted from a soil core taken near the site have helped researchers model the ancient environment. These reconstructions have shown that, during the imperial occupation of Vagnari, temperatures and precipitation patterns in southern Italy were varied and unpredictable. Several seasons of failed crops may have encouraged farmers to attempt to protect themselves from this volatility by planting a little bit of everything so that if one species failed, another would, hopefully, succeed.

Carroll has also found evidence that industries besides farming were present at Vagnari. An abundance of lead slag, as well as artifacts such as weights and pipes, suggests that the estate employed lead smelters. Ceramic wasters, or pots that were damaged during firing, have been found across the site, indicating that the estate's workers were continuing in the tradition of the overseer Gratus.

GIVEN THE SCOPE OF industrial production at Vagnari starting in the first century A.D., the number of people working on the estate must have been large. However, because only a portion of the cemetery has been excavated thus far, its full size and, therefore, a population estimate remain uncertain. In Roman settlements, it was illegal to bury

the dead within town limits, and the Vagnari cemetery, the largest Roman cemetery yet discovered in southern Italy, is a quarter of a mile from the vicus. Prowse and her team have focused on a section of the cemetery dating from the second century A.D., where more than 140 well-preserved burials have been uncovered. These include cremations, the burial style typical of Roman culture at the time, and two types of inhumation burial more typical of local southern Italian populations. The occupants of the graves represent the full range of individuals who lived and worked at Vagnari, including infants, children, adults, and the elderly. Grave goods the team has discovered include marble and bronze vases, silver and bronze rings, gold earrings, household items such as tweezers and knives, coins, lamps, and a wide range of ceramics, distributed across the burials. Prowse thinks this suggests that Vagnari's inhabit-



Clockwise from top left: A pair of gold earrings with a glass bead, a bronze table amphora for serving wine, and a ceramic lamp depicting a bearded man were all uncovered in the burial.

ants may have been relatively equal in terms of their material wealth—in Roman cemeteries, class is clearly indicated by the quality of the artifacts. Using isotope analysis and DNA studies, Prowse's team has also demonstrated that the majority of those interred in the cemetery came from the region. "Many people have this idea that when Rome came into an area they would boot everyone out and then import foreign slaves," Prowse says, "but that's not what happened here. This estate relied more heavily on local populations." A fascinating exception may be two skeletons containing genetic markers specific to both China and Southeast Asia. While Prowse can't be sure whether the individuals migrated directly from Asia or were descendants of earlier immigrants, the discovery offers a rare glimpse of Rome's connections to the East.

Because the skeletons at Vagnari are well preserved, Prowse and her team have been able to investigate whether certain demographic groups—for example, men or freeborn

people—were healthier than others. Excavations conducted in second-century A.D. cemeteries in Rome and around the Bay of Naples have shown that, in general, free men were much healthier than free women or slaves. The skeletons at Vagnari, however, suggest a slightly different pattern. Prowse's team has analyzed bone fracture patterns and tooth enamel wear of the remains and found that, in general, people living at Vagnari were fairly healthy, well nourished, and lived in much better conditions than those found in Roman urban centers. As the full range of social classes are believed to have been buried in the Vagnari cemetery, this pattern shows that the estate's inhabitants, including both enslaved and free people, were basically well treated. Whether this was true at other imperial estates is unclear. "We don't really know if having such an equal display of health status and material goods in the cemeteries is normal because this is one of the first times that we have a good skeletal collection with great context from a rural site," Prowse says. "Until we find more, we're not sure what the pattern is, or if there even is one."

While the conditions at Vagnari appear to have been better than those of Roman cities, they were far from perfect. The human remains show that many children died during infancy, and that broken and disfigured bones and diseases were common. Analysis of DNA from one skeleton has identified the first known evidence of malaria in Roman southern Italy. "This was surprising because we expected to find early signs of malaria along Italy's coast, not necessarily in the interior," says Prowse. "The disease's occurrence at Vagnari is likely tied to ecological and climatic factors such as deforestation and agricultural activity that led to increased opportunities for malarial mosquitos to come into contact with humans."

Another significant health threat was the prevalence of lead throughout the site. The highly toxic metal was ubiquitous in ancient Rome. "We know lead was used in cosmetics to make the skin appear whiter, and that wine was boiled down in lead vessels to sweeten it," Prowse says. "We also have evidence of lead pipes being used to distribute water." She and her team are currently conducting the first comprehensive analysis of lead absorption into Roman skeletons, and preliminary findings indicate that the people of Vagnari had higher than normal levels of lead in their teeth. Once complete, this analysis will inform scholars' understanding of lead's effects throughout the Roman Empire.

Only a small portion of the ancient site at Vagnari has been excavated thus far, but the work there is already providing fresh information about Roman life. "Whatever we find out here will be new and will provide an example of how to explore an imperial estate," says Carroll. Research at Vagnari will continue for years to come, but, much like its ancient economy, will follow the seasons and harvests. At the end of each summer, the archaeologists fill in their trenches and Vagnari returns to its agricultural origins as farmers plant wheat, cultivating the land as people have done for more than 2,000 years. ■

Matt Stirn is a journalist and photographer based in Jackson Hole, Wyoming, and Brookline, Massachusetts.

Magical Beasts of Babylon

**How the Ishtar Gate safeguarded
the Mesopotamian world**

by JARRETT A. LOBELL

An image of a striding lion
created of molded and glazed
bricks once decorated the
processional way to the Ishtar
Gate and Temple of Marduk in the
city of Babylon, in modern Iraq.



THE RESIDENTS OF BABYLON in the first millennium B.C. saw themselves as facing their past and walking backward into the future. In the Akkadian language of ancient Mesopotamia, the word *panu*, or “face,” relates to the past, whereas “behind” is a word associated with the future. Reverence for the past was at the heart of the Neo-Babylonian king Nebuchadnezzar II’s (r. ca. 604–562 B.C.) plan to rebuild Babylon. By his time, the city was already more than 1,500 years old and had been shattered by a recent war with the Assyrian Empire. The king and his advisers, called *ummanu*, who were considered to be descended from divine sages and were experts in religion, architecture, and magic, wanted to create a capital both earthly and divine for their newly established empire, which covered much of their known world. “Babylon was the religious center of the universe and the place of creation of the world, where the gods came to meet humans,” says ancient Near Eastern historian Elizabeth Knott of New York University.

At the heart of the reconstructed city was the three-city-block-long processional way to the Temple of Marduk, the city’s patron god, which ended at the Ishtar Gate. Knott and her colleague Anastasia Amrhein, an art historian at the Uni-

versity of Pennsylvania, recently explored how the processional way and gate, which stood at the literal and metaphysical junction between humans and the divine, were monuments to the Babylonians’ past and to their relationship with the natural, man-made, and spiritual worlds.

The Ishtar Gate’s designers adorned it with vividly colored glazed reliefs depicting hundreds upon hundreds of ferocious creatures—lions, bulls, and mythical Mesopotamian hybrid beasts called *mušḫuššu*, dragons that have the body of a snake, front legs of a lion, and back feet of an eagle. But when it was discovered more than 100 years ago, the gate was in pieces. At some time after the fall of Babylon in 539 B.C., brick miners began slicing off the glaze and reusing the finely crafted twice-baked bricks in other structures. Between 1899, when German archaeologist Robert Koldewey discovered the first fragments of the gate, and 1914, when his excavations at Babylon were halted by the outbreak of World War I, archaeologists collected tens of thousands of pieces of glazed brick. Eventually, these fragments were sent to Germany, where, beginning in 1928, conservators began to reconstruct the gate. There, in Berlin’s Pergamon Museum, the gate’s magnificence could once again be appreciated, as it had been when Nebuchadnezzar



A bull (right), one of the animals sacred to the ancient Babylonians, is depicted on the Ishtar Gate. Some of the gate's bricks were left unglazed. A molded- and glazed-brick image (below) of a *mušḫuššu*—a mythical Mesopotamian dragon with the body of a snake, front legs of a lion, and back legs of an eagle—once adorned the Ishtar Gate.



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A Mesopotamian cylinder seal and its impression show a king sparring with two lions.

II claimed that he had “filled his gates with splendor for the wonder of all people.”

Yet what visitors to the Pergamon Museum see today is, like all reconstructions, as much a product of the imagination of those who assembled it as it is an accurate representation of what the processional way and gate actually looked like. In order to fully grasp the monument’s significance, suggests Knott, it needs to be regarded with the sensibilities of an inhabitant of the ancient Near East. In an attempt to do so, she and Amrhein undertook a new examination of the Ishtar Gate focusing not only on its iconography, as scholars traditionally have, but also on the materials and processes used in its construction. “How something is made is what really connects us to the past and the ancient way of thinking about it,” Amrhein says.

They began by reflecting upon clay, the substance from which, according to Babylonian mythology, the first humans were created. “Clay is not just the thing lying around in your backyard that you have to use because it’s cheap,” says Knott. “It’s deeply connected to the gods.” Next they considered the molds used to make the gate’s flat bricks and reliefs. According to Amrhein, the process of molding is important because it allows the artist to replicate a design and is linked to ideas about creation and procreation. “In a world where consistency and tradition were valued over individuality and innovation in art, using molds was one way to ensure that images were authentic and repeatable,” she says. For example, the processional way features some 120 identical lions, each of which would have required about 70 individually molded bricks. “The ability to repeat these idealized images was important to the Babylonians, who believed the forms were passed down from the gods,” says Amrhein. The experience of viewing replicated imagery would have been familiar for inhabitants of the ancient Near East—the engraved cylinder seals they had used to identify themselves in correspondence and business transactions for centuries also produced infinitely repeatable images.

IN CERTAIN AREAS OF Nebuchadnezzar II’s processional way and gate, the bricks were left unglazed. In other sections, however, artists employed the brightest colors available, in particular blue. The color blue, and especially dark blue, was important to the Babylonians, as it represented the heavens.

Thus, it was another means of connecting to the gods. Nebuchadnezzar II refers to his monument as being “lapis lazuli colored,” and, in fact, the Akkadian word for blue is the same as that for the semiprecious stone. In their study of the gate, Knott and Amrhein have come to understand that blue glaze was not used to imitate valuable stone or other more expensive materials. “We wanted to highlight the ways in which manufactured materials, such as glass, glaze, and faience, were valued in the ancient world and to argue against the idea of imitation as a lesser form,” Amrhein says. A great deal of labor was required to make these materials—crushed minerals and plant ashes used to produce colorings had to be imported, the ideal firing temperature had to be established, and, before any

of this work even began, rituals had to be performed to ensure the success of the process. “Making glaze is like alchemy,” says Amrhein. “You combine things and something radically different comes out of it.”

Scholars know from texts of Nebuchadnezzar II’s time that the Babylonians called the Ishtar Gate “Ishtar Repels Its Enemies.” In ancient Mesopotamia, gates were sites for conversation and commerce, but also weak points in a city’s defenses that required extra protection. “A gate is a place full of possibility,” says Amrhein, “and also a place of danger.” Thus Ishtar, the fierce goddess of war, along with the full force of the



Babylonians’ past—iconography, technological skill, and ideas about their relationship to the gods—were enlisted to protect the most sacred part of the city at the center of their empire. “The lions on the walls along the processional way seem to watch—or glare at—your every step,” says Knott. “The bulls and dragons on the gate are also positioned in such a way that they stare at you as walk into the city.” Like the Babylonians’ entire world, the processional way and the Ishtar Gate were charged spaces. “In the ancient Near East everything was alive—clay, the materials for making glaze, all were animate,” says Amrhein. “Everything was viewed as magical and vital, and everything had the potential to impact the world in a very real way.” ■

Jarrett A. Lobell is editor in chief at ARCHAEOLOGY. A Wonder to Behold: Craftsmanship and the Creation of Babylon’s Ishtar Gate will run at the Institute for the Study of the Ancient World in New York City from November 6, 2019, through May 24, 2020.



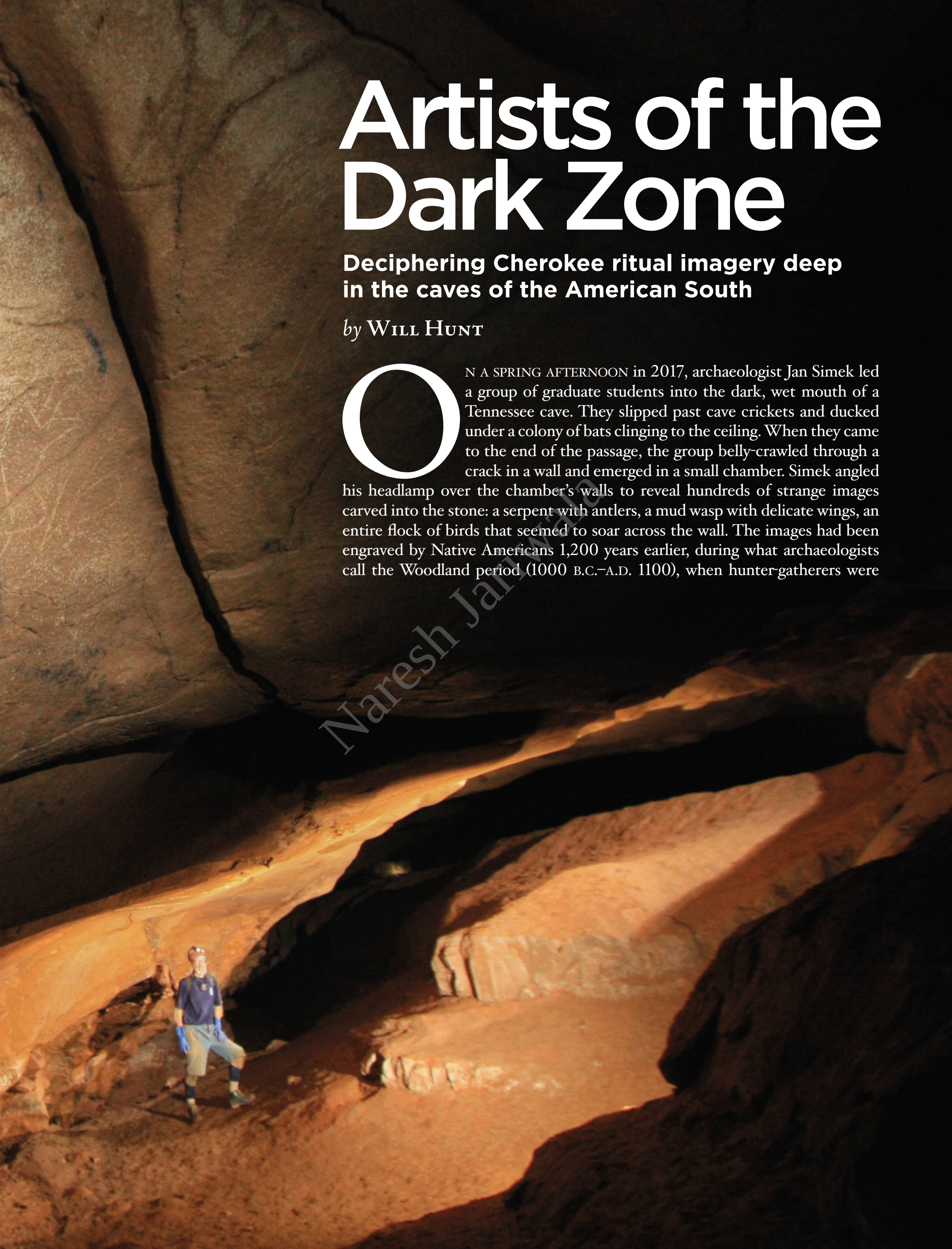
Panels of artwork engraved by Native Americans between 1,000 and 400 years ago have been found deep within a cave now known as Unnamed Cave 11. More than 100 such caves have been discovered in the woodlands of Tennessee, Alabama, and Kentucky.

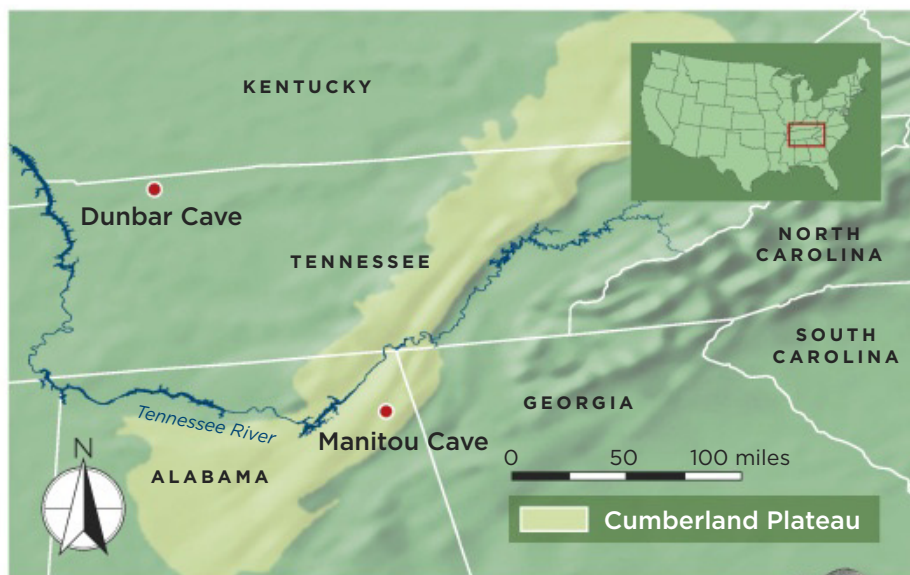
Artists of the Dark Zone

Deciphering Cherokee ritual imagery deep in the caves of the American South

by WILL HUNT

ON A SPRING AFTERNOON in 2017, archaeologist Jan Simek led a group of graduate students into the dark, wet mouth of a Tennessee cave. They slipped past cave crickets and ducked under a colony of bats clinging to the ceiling. When they came to the end of the passage, the group belly-crawled through a crack in a wall and emerged in a small chamber. Simek angled his headlamp over the chamber's walls to reveal hundreds of strange images carved into the stone: a serpent with antlers, a mud wasp with delicate wings, an entire flock of birds that seemed to soar across the wall. The images had been engraved by Native Americans 1,200 years earlier, during what archaeologists call the Woodland period (1000 B.C.–A.D. 1100), when hunter-gatherers were





beginning to settle into an agricultural lifestyle. When the group eventually retreated toward the exit, one of Simek's students, a tall, quiet man named Beau Duke Carroll, lingered in the chamber. He was staring at a small carved figure of a man with wings and a sharp beak. Carroll is Cherokee, a member of the Eastern Band born and raised on Cherokee-owned territory in North Carolina. His ancestors once called this part of Tennessee home. Carroll pulled from his pocket a pouch of tobacco that had been consecrated by Cherokee elders and sprinkled it over the cave floor, then he turned and crawled back out.

Twelfth Unnamed Cave, as this cave is known, is one of more than 100 caves in the woodlands of Tennessee, Alabama, and Kentucky where, in recent years, archaeologists have uncovered a vast trove of prehistoric art. The Unnamed Caves—so called to obscure their locations from looters—contain extraordinary images of humans, animals, celestial beings, and phantasmagorical creatures. They take the form of carved petroglyphs, charcoal pictographs, and mud glyphs traced into soft walls. The oldest artworks go back more than 6,000 years, but most were made during the Mississippian period, between A.D. 1000 and 1600. Like the renowned Paleolithic cave paintings of Lascaux in France and Altamira in Spain, the artworks in the Unnamed Caves appear in what archaeologists call the “dark zone,” the deepest stretches of a cave, beyond the reach of natural light. The ancient artists reached these chambers by squeezing down long passageways and climbing on ropes or wooden scaffolding, all by the faint light of torches made of river cane. Simek and his team have spent years documenting the Unnamed Caves, recording and mapping each image, trying to comprehend what drove the artists so deep into the dark. To find answers, Simek has recently joined forces with Cherokee scholars such as Carroll, who are combining scientific archaeological practices with deep-rooted traditional tribal knowledge. Together, they are bringing life to the ancient artworks in ways no one had thought possible.

The first dark-zone art in the Southeast was discovered in 1979, when two local cavers shimmied down a cave passage in Tennessee and noticed an image of a bird incised into a mud wall. One of the cavers happened to have studied Native American archaeology and recognized the imagery from statues, bowls, and weapons excavated from burials at Mississippian mound cities such as Cahokia, near present-day St. Louis. The iconography was typical of the Southeastern Ceremonial Complex, the term given to a common set of religious practices and symbols that spread through the Southeast during the late Mississippian period. For rock art researchers in North America, the cave, dubbed Mud Glyph Cave, was a revelation. They had seen many examples of Native American rock art painted on cliff faces and carved into the walls of canyons, but never in the pitch-dark depths of caves.

When Simek arrived at the University of Tennessee in 1984, he was intrigued by the findings at Mud Glyph Cave. He had begun his career excavating caves in Europe and cherished his visits to Lascaux and Altamira, peering in the dark at 17,000-year-old images of reindeer, horses, and bison galloping across the ceiling. “I’d look up at those paintings and just tremble,” he recalls. He wondered what secrets the limestone hills of Tennessee might hold.

Simek focused his search on the landscapes stretching beyond Mud Glyph



A 13th-century copper plate (top) unearthed in Georgia depicts a “birdman,” a motif associated with religious practices that spread across the American Southeast after A.D. 1000. A depiction of a similar figure (above) was discovered in Eleventh Unnamed Cave.

Cave, including the Tennessee River Valley and the Cumberland Plateau, both of which are honeycombed with caves. He spent long summer days bushwhacking through the forest in scorching heat, dodging timber rattlers and slapping at chiggers as he searched for caves. As a newcomer to Tennessee, Simek was still learning to read the landscape, so he recruited a team of local cavers and amateur historians, people who knew the land intimately. It was not long before they began to find caves containing traces of prehistoric visitors—charcoal streaks from cane torches, ancient footprints, and images engraved on the walls. “Once we knew what to look for, we began finding art everywhere,” Simek says. He saw engravings of owls and a type of fish called gar, reliefs of turtles, and even portrayals of men playing stickball, a ceremonial game played by Mississippian peoples. Each year, Simek and his crew discovered more new sites and added to the catalog of Unnamed Caves.

In Europe, early twentieth-century archaeologists had developed a theory that the artworks at Lascaux and other caves were the visible remnants of prehistoric religious practices. Simek saw hints that the Unnamed Caves had also, perhaps, been the sites of religious rituals. In Eleventh Unnamed Cave, for example, he discovered the ceiling was studded with more



A wall in Unnamed Cave 51 is covered with lines that do not form a recognizable figure.

than 100 fist-sized gobs of mud that contained half-burned stalks of river cane. The ancient Native American artists, it seemed, had set the cave’s interior ablaze with prehistoric sparklers. Sometimes Simek would slip into a chamber and find ash fallen from torches thousands of years ago preserved in the cool mud.

As Simek and his team explored more and more caves and recorded the iconography and location of each image, they began to detect patterns. Images carved closer to the cave entrance tended to be clearer, more realistic representations—humans holding bows, for example—while the deep, hard-to-reach galleries contained images that were more enigmatic,



Images of what appear to be panthers with eagle talons were identified deep in Unnamed Cave 60. Otherworldly creatures feature prominently in the remote galleries of the Unnamed Caves.

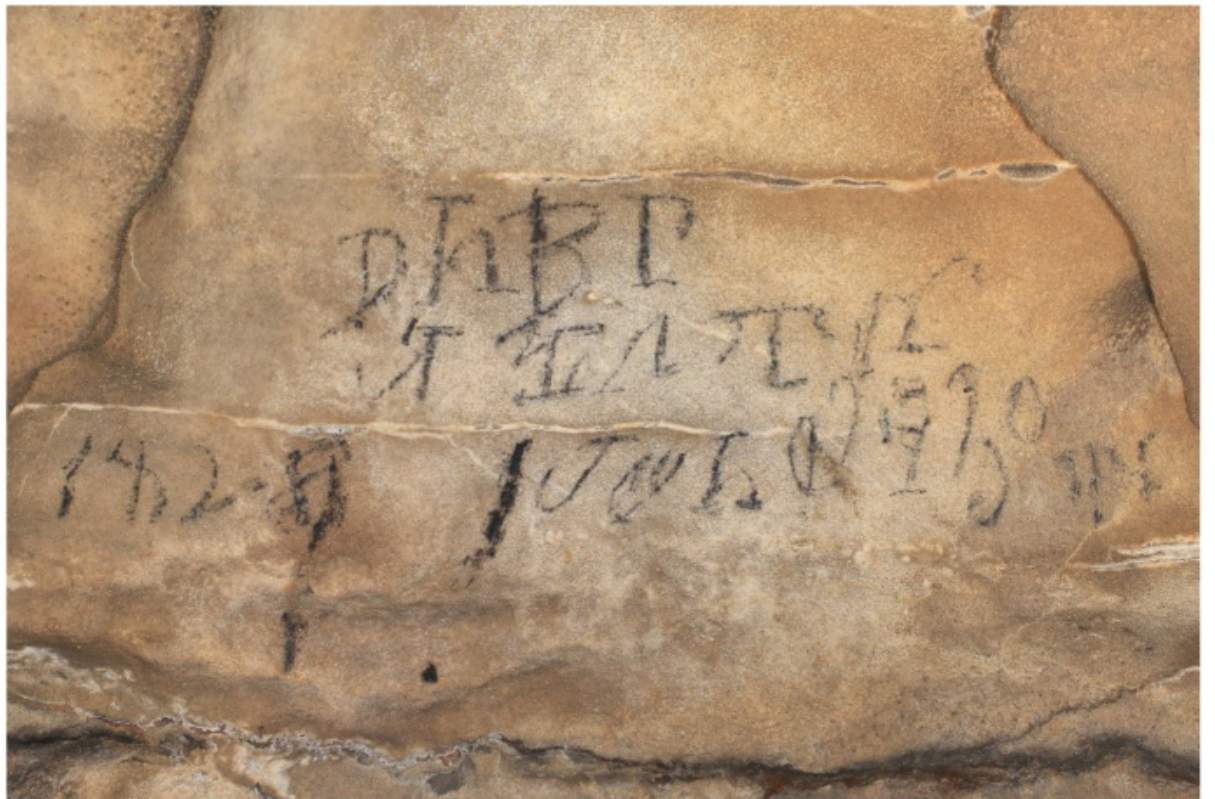
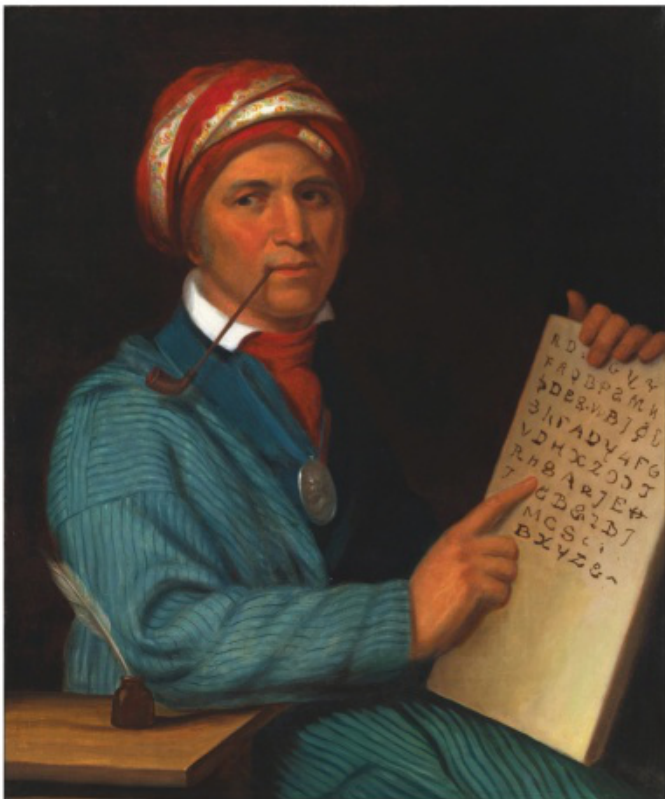
such as men with bird wings and panthers with eagle talons. “They seemed to be moving from mundane to transcendent,” Simek says, “from visible world to underworld.”

From time to time, Simek found himself staring at a cave wall that had been deliberately scratched in an almost frantic manner, without any attempt to create a figure. It seemed that interacting with the walls was, in itself, a significant activity. Sometimes he came across images of human faces drawn on walls alongside large hands, as though the artist were portraying a person pressing against the wall from within. To Simek, the images looked like beings who lived beyond the rock wall reaching out to the viewer. He imagined that the ancient artists treated the cave walls as a veil between the earthly world and the supernatural world beyond.

Simek knew that all of this was conjecture. Like the cave paintings in Europe, the artworks in the southeastern woodlands were created well before the beginning of recorded history. “With prehistoric art, we’re always speculating,” says Simek. But, unlike the paintings in Lascaux and Altamira, where all direct knowledge of the artists has been lost to history, the images he was finding in Tennessee had been made by people whose descendants were known and who, in some cases, still lived near the caves. Simek wondered if the caves might still hold a place in the memory of Native Americans—but he didn’t know how to test this notion.

Then, in 2015, Carroll enrolled in the master’s program in archaeology at the University of Tennessee, where Simek was the head of the department. When it came time to write his thesis, Carroll turned to a site in northern Alabama called Manitou Cave. There local cavers had made a startling discovery almost a decade before.

THE MOUTH OF MANITOU CAVE opens on the side of Lookout Mountain, above the town of Fort Payne, which, during the nineteenth century, was the site



A portrait (left) shows the Cherokee scholar Sequoyah holding a page inscribed with the Cherokee script he invented in the early 19th century. An inscription (right) written in Sequoyah's script in Manitou Cave refers to leaders of a stickball team.

of a thriving Cherokee community called Willstown. On a recent morning, Carroll and Simek hiked a mossy trail up the mountain. Carroll, now a Cherokee tribal historic preservation officer, led the way. Together they slipped into the mouth of the cave, where they were engulfed by a heavy, wet darkness.

The Cherokee relationship with caves is intimate—the name Cherokee is said to mean “People of Cave Country”—but fraught. From boyhood, Carroll had been taught by elders that even the smallest step into the mouth of a cave was the beginning of a spiritually potent and potentially dangerous endeavor. “Everything in a cave is the opposite of the surface world,” says Carroll. “It’s dark, it’s chaotic. Things are unpredictable.”

For much of the last two centuries, Manitou, which is privately owned, has been a tourist attraction renowned for its towering stalagmites and soaring chambers in which the cave’s late nineteenth-century owners would host candlelit dances. Close to the entrance, the cave walls are covered with graffiti. As Carroll and Simek moved deeper into the cave, they passed layers of looping signatures dating to the late nineteenth century alongside more recent exclamations of “Roll Tide,” the University of Alabama’s rallying cry, left by local teenagers. Eventually they clambered beyond the tourist route, following the path of a burbling stream until they reached the last chamber, some three quarters of a mile from the entrance. Carroll illuminated one wall, revealing a curious tableau of engraved text. At first glance, it resembled the Latin alphabet, but a closer look revealed unexpected flourishes and serifs. In fact, the characters were part of the Cherokee syllabary, a writing system whose characters represent syllables rather than vowels and consonants. It was developed in the early nineteenth century by the renowned Cherokee scholar Sequoyah—also known as George Guess—as the written expression of the spoken Cherokee language. Sequoyah’s syllabary was a landmark achievement, the first time in recorded history an individual indigenous person had developed a writing system for a strictly

oral language. While the precise details surrounding the development of the syllabary are elusive, historians do know that Sequoyah and his family lived in Willstown.

Simek had been aware of the inscriptions since 2006, when they were first spotted by local cavers, but no one knew what they meant until Carroll undertook to translate them. Carroll had learned to read Cherokee in school, but because the language varies from region to region and has evolved over generations, portions of the text escaped him. He spent months working with Cherokee historians and tribal elders, showing them images of the text and gradually piecing together their interpretations. When Carroll finally presented his findings, Simek was stunned. The inscriptions described, in rich detail, a religious ritual performed in the cave nearly two centuries earlier.

Deeper inside the cave, Carroll cast his lamp beam over one stretch of neatly painted script and read aloud: “on the thirtieth day of their month April 1828.” It was the date on which the ritual’s participants visited the cave. “Their” referred to the calendar of the encroaching white settlers. Carroll continued reading with only the light from his lamp penetrating the dark, pointing out where the visitors identified themselves as “the leaders of the stickball team.” The ball game is still played by Cherokee people today—Carroll himself had grown up playing it. Much like lacrosse, stickball is played by two teams using sticks with baskets attached to move a ball through goals at either end of a large field. But it is more than just a game—it is a symbolic reinforcement of the Cherokee cosmos, an homage to past warriors, and a training ground for future warriors. The Cherokee call stickball “the little brother of war.” A single contest could last multiple days and would be punctuated with religious ceremonies in which a medicine man led the players to a secluded place to perform rituals. During these ceremonial intermissions, which Carroll knew from ethnographic literature as well as from personal experience, the ballplayers danced, prayed, bathed in smoke, and cleansed themselves in sacred

spring water. The inscriptions in the cave made reference to some of these very rituals. Carroll guided Simek to an inscription engraved in the wall next to where the cave's stream bubbled up from the earth. "We call it 'going to water,'" said Carroll. He was quiet for a moment, as he and Simek listened to the echo of the stream in the dark. "Where water comes out of the ground, you could say it's like a portal to the spirit world."

Many of the inscriptions in Manitou Cave startled Cherokee elders because they were so sacred, referencing religious practices that Carroll could not speak about publicly. On one wall, Carroll found the signature of the medicine man who led the rituals—"the man of authority," as he calls himself in the inscription. The medicine man was Richard Guess, the son of Sequoyah. At the time of Guess' visit with the stickball team, the Cherokee were facing a cataclysmic upheaval. Just two short years later, President Andrew Jackson would sign the Indian Removal Act. This law required the Cherokee to leave their homeland and migrate to territory that later became Oklahoma on the journey known as the Trail of Tears. A number of Cherokee, though, took refuge in the mountains of North Carolina, eventually becoming the Eastern Band. Carroll suspects that Guess and the Cherokee ballplayers, with the threat of removal looming, traveled so deep into the cave and took such great pains to record their visit in order to leave a record of their practices for future generations. "They wrote this to be preserved over time," he says.

Before exiting the cave, Carroll and Simek paused in a high-ceilinged hall where, high above the tourist graffiti, is an inscription. It reads DBBʔWōᎠ, or *a-yv-si-li-ta-s*, Cherokee for "I am your grandson."

"They're addressing the Old Ones," says Carroll. Then he explained something curious: The inscription was actually written backward, the symbols moving from right to left.

"They didn't write it to be read from down here," he said, gesturing to the cave floor. The intended readers, it seemed, were the spirits of ancestors on the other side of the stone.

ARCHAEOLOGISTS HAVE LONG used oral history and ethnography to help them understand the past. But Carroll's findings have opened an entirely unprecedented line of inquiry, in which indigenous practitioners of a ritual have left written accounts of their own ritual practices, in their own words. "They are telling us that this was a ritual space," says Simek. "It's not speculation. We know."

Carroll recognizes that he cannot necessarily apply contemporary Cherokee beliefs to the imagery in the Unnamed Caves. Yet he also knows that many of his tribe's traditions are rooted in the stories and beliefs of older, ancestral tribes who inhabited this landscape long before the Cherokee. On occasion, when Carroll visits an Unnamed Cave with Simek,

he finds imagery he recognizes from tales his grandparents told him. Many Cherokee stories, for example, revolve around characters known as the Thunderers, celestial beings known for their ability to transform from human to animal—man to hawk, man to bear. During that first visit with Simek to the hidden chamber of Twelfth Unnamed Cave, when Carroll saw the engraving of the man with wings and a beak, he had thought of the Thunderers.

Recently, Simek and Carroll traveled together to Dunbar Cave, an eight-mile-long cavern in middle Tennessee that lies on one branch of the Trail of Tears. At the end of a winding passage, they came to an expansive hall. When they reached the back wall, they crouched together before a charcoal painting made during the Mississippian period, around A.D. 1300. It was of a man, stretching seven feet long. Instead of feet, he had large animal paws with sharp claws—he was changing shape, transforming from human to animal. Were they looking at an ancestral expression of a Cherokee Thunderer from 700 years



A ca. 700-year-old depiction in Dunbar Cave of a man with animal paws in place of hands and feet may represent one of the Thunderers, characters in Cherokee stories who can shift from human to animal form.

ago? Perhaps. They can never know for certain.

Shortly after their visit to Dunbar Cave, Simek and Carroll learned that a park manager had found an inscription in the Cherokee syllabary etched into a wall not far from the shape-shifting figure. Carroll is not yet sure what the characters say, but he understands their significance. In the early 1800s, as his ancestors walked the Trail of Tears, they paused to visit this cave and leave their mark in a place that had long inspired reverence—a place where their ancestors had found both communion and solace since the earliest days. ■

Will Hunt is the author of *Underground: A Human History of the Worlds Beneath Our Feet*. To see more images from the Unnamed Caves, go to archaeology.org/caves.

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An aerial view of Baydha, a settlement beside the Shara Mountains and north of Petra's famous city center that contains archaeological evidence spanning more than 10,000 years

LETTER FROM JORDAN

BEYOND PETRA

After the famous city was deserted, a small village thrived in its shadow

by SARA TOTH STUB

For more than two millennia, travelers, merchants, and scholars have been awed as they walked through a gorge in the desert of western Jordan to find themselves in a city carved almost entirely from red sandstone. Named Petra, meaning “rock,” by the Roman emperor Trajan in the second century A.D., the earliest city at the site dates to the second century B.C. At that time, the Nabataeans, a Semitic people whose origins are unclear, began building their grand capital, which, according to an inscrip-

tion found there, they called Raqmu. The Nabataeans controlled the regional trade in gold, spices, and other luxury goods, which were transported between Gaza, with its access to the Mediterranean—and thus to the rich markets of Greece and Rome—and places as distant as India and China. Raqmu’s art, architecture, and lifestyle reflected the myriad cultural influences garnered from the Nabataeans’ trading relationships with the Persian, Greek, Roman, and Egyptian worlds. The city featured posh hilltop villas

similar to those built by King Herod the Great of Judea, depictions of Greco-Roman deities such as Dionysus and Aphrodite, and stone columns topped with carved human heads, a tradition rooted in Middle Kingdom Egypt of the second millennium B.C. In an area with limited rainfall, the Nabataeans’ complex and difficult-to-maintain water management system spurred the city’s construction and its thriving local agricultural economy.

Although Raqmu’s reliance on its water system later proved to be one

LETTER FROM JORDAN

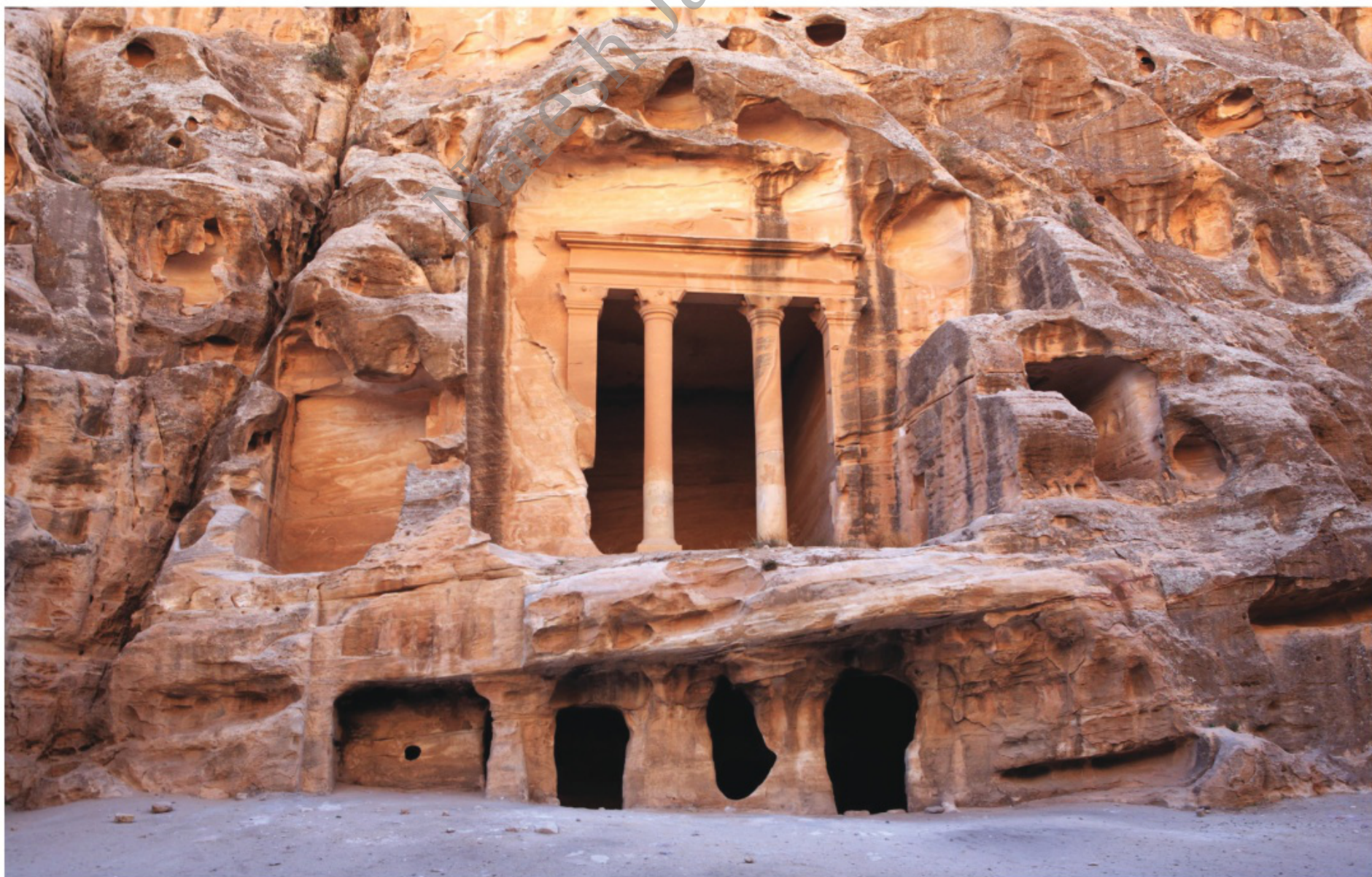


cause of its undoing, for several hundred years, the water supply supported fruit orchards and olive groves in the city center. The suburban areas were even more lush. An ancient settlement just east of Petra's grand entrance, in what is now called Wadi Musa, had ready access to spring water and was home to dozens of olive trees and olive presses.

Since the 1970s, archaeologists have discovered more than 30 rock-cut wine presses in Baydha, a settlement three miles north of Petra's center. This evidence of intensive viniculture starting in the first century B.C., when the Nabataeans began to adopt cultural practices from the Greek world, including the consumption of wine, was an early indication that Baydha, although smaller and less architecturally magnificent than central Petra, was nevertheless an important part of the city's history.

The Nabataean Kingdom, which

controlled an area from the Arabian peninsula to Damascus, was at its height in A.D. 106, when Trajan (r. A.D. 98–117) annexed Petra. The era's textual sources are mainly silent on the subject, but most scholars agree that the emperor likely encountered little resistance, and he soon made the area part of the new province of Arabia. Initially, Petra continued to benefit from trade under the Romans, the profits of which paid for urban improvement projects such as renovation of a public park and pool complex and construction of watchtowers. An increased number of farming terraces from that time indicate that the city's residents also expanded their agricultural production, which helped support Petra's growing population. In the mid-second century A.D., according to contemporaneous documents found in a cave on the western shore of the



A rock-cut tomb in Siq al-Barid, a part of Baydha sometimes called “Little Petra,” features an example of Nabataean architecture.

Dead Sea, the city was prominent enough to warrant visits from the provincial governor. But the main sources of Petra's wealth and success would soon come to an end.

By the third century A.D., a shift in trade routes made the city obsolete, and references to it nearly cease in the historical record. The road from Petra to Gaza had fallen out of use, and historical sources, such as the writings of the historian Eusebius of Caesarea and accounts by Christian pilgrims, indicate that more goods from Asia and India were making their way west via southern sea routes or by a northern route through what is now Syria. At the same time, the demand for exotic eastern goods such as spices and perfumes plummeted as the Roman Empire experienced political turmoil and economic challenges brought on by numerous invasions and military engagements. Excavations at Petra have shown that there was a sharp decline in the number of ceramic vessels used to store cosmetic oils perfumed with ingredients from the East, a once-booming industry that had endured since Petra's founding. Financial setbacks such as this, along with an A.D. 363 earthquake referred to in



Remains of the Neolithic section of Baydha, dating to some 9,000 years ago, were one of the first areas outside central Petra to be excavated.

a letter written by a bishop of Jerusalem and widely visible in the site's collapsed and damaged structures, led scholars to consider this period, for all intents and purposes, the end of Petra.

Archaeologists have excavated at Petra since the late nineteenth century, concentrating mostly on the rock-carved Nabataean tombs

and shrines, and have paid less attention to other periods within the city or to its outskirts. "This has led to the narrative that Petra was abandoned after the Nabataeans," explains archaeologist Micaela Sinibaldi, an honorary research fellow at Cardiff University. "But we now know that this is just not true. The later periods of Petra have simply been overlooked." In fact, the full trajectory of the region's cultural and religious history, from paganism to Christianity to Islam, is evident in the areas surrounding Petra.

Since 2014, Sinibaldi has directed the Islamic Baydha and Late Petra Projects. "It's exciting because there is so much to discover about the later periods of Petra," she says. "In Baydha, especially, there is the most significant and, at the same time, accessible evidence we have available for the Islamic period in the entire Petra region." Because there is scarce evidence of a human presence in Petra after the sixth century A.D., the hinterlands have emerged as the key place to find out about these later centuries. "Baydha is a relatively small place, but it includes, for the most part, all the



The Great Temple at Petra was completed in the first century B.C. It measures 127.5 feet long and 105 feet wide, and is the largest freestanding structure in the city. The temple was used until the fifth century A.D.

LETTER FROM JORDAN

archaeological periods present in Petra and its environs,” Sinibaldi says. “Not very much was written in the historical accounts, but we do have the chance to make up for this with archaeology. It’s a matter of reconstructing several pages of history that we are missing.”

The settlement of Baydha includes Siq al-Barid, nicknamed “Little Petra,” a gorge filled with Nabataean carved tombs,

dwelling, and dining areas similar to those found in the center of Petra. In the 1950s, British archaeologist Diana Kirkbride-Helbaek was among the first researchers to raise scholars’ interest in non-Nabataean settle-

ment in and around the city. “By way of a change from things Nabataean, I used to explore the region on my free days looking for flint sites,” Kirkbride-Helbaek wrote in a 1968 article in the journal *Antiquity*. With



the help of local Bed-

ouin, she excavated

Neolithic Bay-

dha, where people

settled more than 9,000

years ago. She found that they lived in a village of

stone houses, cultivated grains such as wild wheat and barley, collected wild pistachio nuts, and raised goats. Kirkbride-Helbaek also studied some of the Nabataean remains and concluded that during their time the area had served as a sort of residential suburb and caravan station.

It was not until the 1990s, however, that the narrative of Petra’s post-Nabataean abandonment first started to be questioned, as archaeologists began to find later remains in both the city center and the surrounding areas. It had long been known that in the fourth century A.D., when the Byzantine, or Eastern Roman, Empire controlled the region, the city’s water management system fell into disrepair, explains Megan Perry, an anthropologist at East Carolina University and codirector of the North Ridge Project in Petra. This, along with the earthquake in the fourth century and another in the sixth, likely spurred many people to relocate to the countryside in search of easier access to water and richer soil. “The city became much less habitable,” Perry says. “But people didn’t disappear, they just gradually moved.” The people in the area were likely descendants of the Nabataeans who had been living there for generations. In fact, at least through the sixth century, much of the population kept their Semitic Nabataean names,



A capital (top) from a dining hall in Baydha shows the influence of Hellenistic and Roman culture on the Nabataeans. In the Byzantine era, an apse and bishop’s chair (above) were carved into an older Nabataean structure to transform it into a church.

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LETTER FROM JORDAN



The larger of the two mosques being excavated in Baydha was constructed no earlier than the 14th century on the foundations of a Nabataean structure after an earthquake destroyed the settlement's mosque.

despite the fact that the language they used was Greek, says archaeologist Laila Nehmé of the French National Center for Scientific Research. “People and languages don’t go away just because power changes,” she says.

Under the Byzantine rulers, some inhabitants of Petra and its environs adopted Christianity, which had become the preferred, state-supported religion, despite their location far from the center of power in Constantinople. In the 1990s, Patricia Maynor Bikai, then assistant director the American Center of Oriental Research in Jordan, excavated three churches dating to the fifth and sixth centuries on a slope overlooking Petra’s main thoroughfare, as well as a bishop’s residence and a three-room building used for baptisms. Archaeologists have

also found that, although the fourth-century earthquake destroyed many Nabataean shrines, some remained in use throughout the Byzantine period, evidence that Christianity had not completely replaced earlier religions. Even more evidence of post-Nabataean Petra began to emerge when Bikai carried out a survey of Baydha in the 2000s. She found that, in the fifth century, one of the Nabataean rock-cut communal halls had been transformed into a church with an apse, and a bishop’s chair had been carved into the rock wall. Bikai also discovered two mosques, thus far the only ones to have been found in this region, and about 100 dwellings that she suspected were from the Islamic period. “We had no idea they were there,” Bikai says. “It shows you don’t get a complete pic-

ture of what Petra was without exploring outside the city center.”

When the population of Petra and the surrounding region adopted Islam on a large scale is an open question. Arabic texts from the 630s refer to Muslim armies from the Arabian Peninsula arriving in the cities of Aqaba and Udruh, but do not contain any discussion of nearby Petra. “Either the armies didn’t take Petra because it was naturally protected,” says Nehmé, “or they didn’t think it was worth it.”

The earliest direct signs of Islam in Petra are seventh- and eighth-century Arabic inscriptions asking Allah for forgiveness. According to Zeyad al-Salameen, an archaeologist at Al-Hussein Bin Talal University, these inscrip-

(continued on page 62)

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LETTER FROM JORDAN

(continued from page 60)

tions are similar in both language and script to other Islamic invocations from the period. While some of the local population continued to practice Christianity, how the rest adopted

or viewed Islam is debated, with few archaeological findings and almost no textual references to help clarify the process. The absence of references to Petra in the historical record seems to indicate that the area was not especially important to most pre-twelfth-

century Islamic rulers, who were based in far-off places such as Damascus, Baghdad, and North Africa. “Petra was on the fringes of Islamic areas of power,” Sinibaldi says. “Islamization there was gradual, and at least until the end of the twelfth century, the area was largely Christian.”

In addition to the paucity of historical records, for about 500 years, from the seventh through twelfth centuries, scant archaeological evidence of how people lived has been found in Petra or in nearby settlements such as Baydha. But Sinibaldi’s work comparing pottery sherds found in Baydha and Petra to those from better-dated excavations in the region revealed that there was not a significant gap in habitation throughout the region. The fertile soil, especially outside the city center, would have kept people living and farming there, she says. The Petra Valley was never completely abandoned, and, because there were rock-cut Nabataean structures available to use, the inhabitants weren’t required to build new dwellings.

The textual record picks up only slightly in the early twelfth century. Accounts include the Latin writings of the priest Fulcher of Chartres concerning European Crusader armies trying to gain a foothold in the Petra area as a means to control some regional trade and pilgrimage routes. The writings of Fulcher and others, including the medieval chronicler and archbishop William of Tyre, refer to the thriving local agriculture, especially in Wadi Musa, which they identify as the largest settlement in the area. Although the Crusaders built three forts in the area, which are still standing today, their occupation of Petra was over by the twelfth century. “Petra is more or less forgotten in the Islamic period,” Nehme says. For this reason, Sinibaldi was intrigued by the Islamic-period village and mosques that Bikai had discovered.



The mihrab (top), or prayer niche, of the later of the two mosques in Baydha was built of reused Nabataean materials and then covered in red plaster. A stone arch (above) in a house in the village of Shammak in southern Jordan, illustrates what the arches inside the Baydha mosques would probably have looked like.

At first, the dating of the mosques and surrounding homes was uncertain. But then, Sinibaldi's team discovered a fourteenth-century Egyptian coin in a *tabun*, or domed oven, that dated one of the houses to the period when the Mamluks, who were originally Turkish military slaves, ruled much of the Middle East from their seat in Cairo. They also had a base at nearby Shobak Castle, which had been built by the Crusaders. Each mosque was built on the foundation of a Nabataean residential building with a dirt floor, stone arch, and wooden roof. The highest-quality stones from earlier Nabataean buildings were used for the mihrab, or prayer niche. Each structure

could have held about 40 or 50 people, suggesting to Sinibaldi that, assuming most grown men attended prayers, about 400 people lived in the village at the time. At some point, an earthquake demolished the building. "I think the later mosque

Small personal items found in the later of Baydha's mosques include an earring, a ring, and a simple oil lamp.

may actually be a replacement for the first, destroyed mosque," Sinibaldi says. Inside the second mosque, she found traces of the people who once prayed there, including an oil lamp, an earring, a ring, and a board game that



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LETTER FROM JORDAN



The hinterlands north of Petra, which include Baydha, have water sources and areas of fertile soil not available in the city center, allowing people to live there long after Petra itself was depopulated.

resembles tic-tac-toe. Because her team did not find any pottery, coins, or other precisely datable artifacts inside either mosque, Sinibaldi hopes that radiocarbon dating of juniper wood used to build the roof will help confirm their construction dates. Although the glory of the Nabataean Kingdom and of Roman Petra had long ago faded, and this stretch of desert highlands was no longer part of the lucrative global trade routes that had once enriched it, the construction of the mosques provides clear evidence that the region was still populated, and that it had undergone at least a partial religious and cultural transformation to Islam.

Sinibaldi attributes the increased population of Baydha during the Mamluk period to the rise in popularity of nearby Islamic pilgrimage routes. The Mamluks, and later the Ottomans, promoted pilgrimages not only to the holy city

of Mecca, but also to burial sites of prophets and saints, she explains. And it was Baydha that profited as a result of this practice. Baydha was only about a day's walk from Shobak, an important stop for both merchants and pilgrims on the route to Mecca from Egypt and the Mediterranean. It was also just three miles from Jabal Haroun, a mountaintop revered as the resting place of the prophet Aaron, who is mentioned in both the Hebrew Bible and the Koran. "Baydha was a relatively well-connected place," says archaeologist Alex Knodell of Carleton College, former field director of the Brown University Petra Archaeological Project, whose extensive survey uncovered a large amount of ceramic evidence from the late Islamic era there. Sinibaldi's team has excavated one of the Mamluk-period houses in the village. Most of the excavated houses' courtyards contain dome-shaped stone tabun ovens, which also

closely resemble those used in modern times. "What is most striking," Sinibaldi says, "is that the building style doesn't differ much from what we see today in this region."

Baydha ultimately outlasted the grand city of Petra, surviving into the Middle Ages and beyond. People built their houses and mosques in Baydha, rather than among the captivating red and pink rock-carved Nabataean buildings in Petra, mainly because access to water was so much easier. The same soil that absorbed the rains coming down the Shara Mountains that attracted people there 9,000 years ago continued to sustain Baydha long after Petra's water systems had failed and people were gone. "There's a lot of history in this small place," Sinibaldi says. "It's important to understand that history is not just made in big centers." ■

Sara Toth Stub is a journalist living in Jerusalem.



JOIN US AT THE AIA-SCS ANNUAL MEETING



The 121st Joint AIA-SCS Annual Meeting is almost here! From January 2 to 5, 2020, more than 2,000 scholars will gather in Washington, D.C., to discuss the latest research and discoveries in archaeology, classics, philology, and related fields. The program begins on Thursday, January 2, with a public lecture by archaeologist Andrea Berlin of Boston University, followed by the Opening Night Reception. Academic sessions will take place Friday through Sunday, January 3 to 5. The meeting will feature the annual gathering of the AIA Council, committee meetings, the second annual trivia night, ArchaeoCon, and a meeting for heritage educators. The Annual Meeting is open to the public; you do

not have to be an AIA member to attend, but registration is required. Be sure to register by November 8 to take advantage of our discounted early-bird rate. Online registration is open through the end of the year, and on-site registration will be available at the meeting. The main venue for the 2020 Annual Meeting is the Marriott Marquis Washington, DC, with additional rooms available at the Renaissance Washington, DC Downtown Hotel located a block away. Book early to secure the discounted group rate. For more information about the Annual Meeting, registration, and hotel reservations, please see the Annual Meeting page at archaeological.org/programs/professionals/annual-meeting.

PLEASE REMEMBER THE AIA WHEN MAKING YOUR END-OF-YEAR GIFTS

All AIA programs are made possible by your subscription and membership dues and through the generosity of our donors who are committed to promoting archaeological research and publication and to protecting and preserving archaeological sites. We encourage you to consider making a donation to the AIA before the end of the year. Your support has both immediate and lasting impacts on the work of the AIA as it promotes ethical archaeological inquiry, educates the public about the importance of archaeology, and fosters an appreciation of diverse cultures and our shared humanity. You can make a gift to the Annual Fund by mailing a check to the AIA at 44 Beacon Street, Boston, MA 02108, or by using our secure online gift page at archaeological.org/donate. If you have questions, please contact Bruce Keeler, the AIA's Director of Development, at bkeeler@archaeological.org or (857) 305-9357. We appreciate your support of the AIA and its mission.



ARCHAEOCON

AIA's second ArchaeoCon will be held on Saturday, January 4, 2020, at the Marriott Marquis Washington, DC. ArchaeoCon is a day of activities and presentations that celebrate archaeology. A morning fair will feature local organizations. Adventurer Josh

Gates, the host of *Expedition Unknown*, and archaeologist Sarah Parcak, the 2016 TED Prize winner and founder of GlobalXplorer®, will once again headline the festivities. There is a small entrance fee if you are not registered for the Annual Meeting. Please visit the AIA website for more details in the coming weeks.



DISPATCHES

FROM THE AIA

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GRANTS, FELLOWSHIPS & AWARDS DEADLINES

The AIA offers numerous fellowships and grants for students and scholars to help support travel, study, and publication. The AIA also acknowledges the contributions of archaeologists, educators, authors, and others at the Institute's awards ceremony held at our Annual Meeting. To be eligible for AIA grants and fellowships, applicants must have been members of the AIA for at least two consecutive years (one year for students) by the application deadline. Details of AIA fellowships, grants, and awards are available at archaeological.org/programs/professionals/grants-awards.

AIA IN THE FIELD

As we continue into the fall and the academic year, we ask those of you who were in the field over the summer to share your photos with the AIA community and the public by mentioning @archaeology_aia on Twitter and Instagram and using the hashtag #AIAintheField.* We hope our members and readers who can't make it into the trenches will enjoy these posts that show where AIA members are working and some of their favorite discoveries. For those participating in excavations, sharing your photos helps you reach other professionals and enthusiasts with a genuine interest in expanding their knowledge.

*Please follow any national or institutional rules that may apply to archaeological work and finds in the country in which you are working.

GRANT WINNER UPDATES



The Kathleen and David Boochever Endowment Fund for Fieldwork and Scientific Analyses

Alison Carter, the AIA's first recipient of the Boochever Grant, is working on a multiyear research project at an Angkor-period provincial settlement in Battambang, Cambodia. Carter is comparing the results of

soil analyses from archaeological contexts to those from ethnographic contexts in an effort to define activity areas within houses. Learn more about the project at archaeological.org/update-from-the-aia-inaugural-boochever-grant-winner.

Society Outreach Grant Winner AIA-North Carolina (Triangle Area) Society

The AIA-North Carolina (Triangle Area) Society was one of several Local Societies awarded a 2018 Society Outreach Award. The North Carolina Society used the funds to host an event featuring a demonstration of Roman hairstyles led by Janet Stephens, an internationally renowned hairstylist and experimental archaeologist. Find out more about this and other events organized by last year's Society Outreach Grant winners by visiting archaeological.org/spring-2018-society-outreach-grant-winners.

ADVOCACY

AIA Supports Chaco Cultural Heritage Area Protection Act

The AIA joined 45 other organizations and Native American tribes to sign a letter in support of the Chaco Cultural Heritage Area Protection Act of 2019 (S. 1079/H.R. 2181). This legislation would provide a mineral withdrawal and permanently prevent new leasing and development on federal lands in the immediate area surrounding the Chaco Culture National Historical Park, helping to protect the land and its archaeological resources.

AIA Signs Multi-Organizational Letter in Support of Increased Funding for the BLM

The AIA, along with 90 other organizations, signed a letter urging Congress to increase funding for vital programs within the Bureau of Land Management, including cultural resources management and the National Conservation Lands.

Read more about AIA advocacy and all the latest AIA news at archaeological.org/news.

INTERACTIVE DIGS

For those interested in more detailed insights into excavation projects, the AIA's Interactive Digs allow you to see an excavation unfold in real time with updates from the field, photos, videos, and more. Find out what's happening in Ferrycarrig, Ireland; Zominthos, Crete; and elsewhere at interactivedigs.com.

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Departure

January 2
January 11
January 15
January 18
January 25
January 26

Days | Max. Guests

(11 days)
(9 days | 12 guests)
(17 days)
(17 days | 12 guests)
(14 days | 12 guests)
(18 days | 12 guests)

Lecturer

Trevor Marchand
Jeff Karl Kowalski
Ian Tattersall
Stephen Harvey
Virginia Miller
Annapurna Garimella

February/March

Absolute Egypt
Morocco: From the Desert to the Sea
Turkish Coast cruise: Cyprus to Istanbul

February 15
March 14
March 15

(17 days | 12 guests)
(15 days | 12 guests)
(11 days)

Stephen Harvey
Trevor Marchand
Michael Hoff

April/May

Iran: The Ancient Land of Persia
Japan by Sea: Land of the Rising Sun
Israel: Treasures of the Holy Land
The Silk Road: Empires of Central Asia
Decorated Caves of the Pyrenees & the Rhone Valley
Scottish Isles & Norwegian Fjords cruise
Amalfi Coast, Sicily & Malta cruise
Ireland's Ancient East

April 8
April 14
May 2
May 15
May 21
May 23
May 24
May 26

(16 days | 12 guests)
(15 days)
(13 days | 16 guests)
(17 days | 12 guests)
(11 days | 20 guests)
(9 days)
(9 days)
(14 days | 12 guests)

Alexander Nagel
Mikael Adolphson
Jodi Magness
Aleksandr Naymark
Ian Tattersall
Elizabeth Pierce
James Higginbotham
Stephen Mandal

June/July/August

Hiking Scotland's Orkney & Shetland Isles
Cruising the Baltic Sea
Hiking Scotland's North Highlands & Isle of Lewis
Human Origins in South Africa

June 27
June 29
July 13
August 31

(11 days | 15 guests)
(10 days)
(11 days | 15 guests)
(15 days | 16 guests)

Val Turner
Elizabeth Pierce
Mary MacLeod Rivett
William Harcourt-Smith

September/October/November

Cruising the Adriatic: Slovenia & Croatia
Sicily: Archaeology, Art & Cuisine
Oman & Zanzibar
Prehistoric Cave Art of Spain & France
The Legacy of Ancient Rome
The Etruscans: Latium, Umbria & Tuscany
Tunisia: Phoenicians to Romans
Island Life: Greek Islands
The Best of Ancient Peru
Ethiopia: The Crown Jewel of Africa
Vietnam, Cambodia & the Mekong River

September 4
September 21
September 26
September 30
October 2
October 9
October 15
October 22
October (TBA)
November (TBA)
November 2

(12 days)
(11 days | 16 guests)
(19 days | 12 guests)
(13 days | 20 guests)
(12 days | 18 guests)
(12 days | 16 guests)
(11 days | 12 guests)
(9 days)
(15 days | 15 guests)
(15 days | 15 guests)
(14 days)

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Al-Baleed Archaeological Park, Salalah, Oman

The human face can sometimes betray a mosaic of emotions, as when competing expressions cross a person’s countenance, capturing a complicated moment. Paleoanthropologist Yohannes Haile-Selassie of the Cleveland Museum of Natural History has described the small cranium he discovered in northern Ethiopia as having a mosaic of features—in this case representing one of the most complicated stories imaginable, that of human evolution. It took a team of researchers three years to identify the species of the fossil—which is named MRD after Miro Dora, the village where it was found—primarily because some of its features are shared with our earliest human ancestors, while others look like more recent ones, explains Haile-Selassie. He and his colleagues have now determined that MRD is a male of the species *Australopithecus anamensis*, a hominin who lived between 4.2 and 3.8 million years ago. Although more than 100 specimens of *A. anamensis* have been found in Ethiopia and Kenya, most are isolated teeth and jaw fragments. In fact, says Haile-Selassie, MRD is the most complete hominin cranium in the fossil record older than three million years ever discovered.

For the last 50 years, scholars have wondered about the relationship between *A. anamensis* and *A. afarensis*, the species most familiar from the fossil known as Lucy. Prior to the discovery and identification of MRD, it was thought that the development from one species to the next followed a straight line, with *A. afarensis* replacing *A. anamensis* about 3.9 million years ago. But MRD is challenging that model. “What we are seeing is that the ancestor and its descendant actually overlapped for at least 100,000 years,” Haile-Selassie says. For this complex and very, very ancient story, MRD, says Haile-Selassie, is a game changer.

WHAT IS IT
Cranium
SPECIES
<i>Australopithecus anamensis</i>
DATE
3.8 million years ago
MATERIAL
Fossilized human bone
FOUND

DIMENSIONS
About the size of a fist



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